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MOTOR AGE

The Yesterday of Motoring

Early Recollections by Chas. E. Duryea

I DO NOT remember when the self-moving bee first buzzed in my bonnet, but as a boy I had read enough to see that the locomotive had crowded out the stage coach. I was a farmer boy when the portable steam engine — commonly called a traction engine, although it was not always a self-propellor—crowded the horse out of such jobs as threshing grain and shelling corn and did this in a community where horseflesh was so cheap as to be almost a nuisance. The treadmill had disappeared within my memory and the small steam engine was being crowded out of the small shops by the gas engine. Electricity was not a sealed book to me, for its principles were set forth in the text books in a way that left much to be learned but that served to inspire experiment, which mother's copper dippers helped along because they needed only a zinc plate and solution to form a complete wet cell.

I had seen the prairies of Illinois almost dotted with light buggies, where I could remember that once there had been no vehicles other than farm wagons. Every farmer's son owned one and many of the hired men were likewise possessors. The bicycle was winning its way to the front and weight was particularly objectionable in it and was shown in its true light because the intelligence that chose the weight also had to furnish the muscle to propel it.

Engines of the Early Days

With these things around me in the early '80s it was not difficult to foresee that for self-propelled vehicles, steam and electricity, although possibilities, did not offer great promise. The gas engine, at that time not common, held forth hope partly because it was not well known. The prevailing gas engine was of the old Otto type, very heavy, very slow-running, and fitted with open-flame slide-valve ignition. But about '85 or '86 I came across a 2-horsepower gasoline engine at an Ohio state fair. It made its fuel from the liquid by a surface carbureter several feet square. A long row of wet coils formed the battery, from which its electricity came, and the engine itself must have weighed about a ton. It was not all roses running it, either. From a nearby exhibit I watched this engine and its exhibitor as he struggled with its occasional refractory exhibitions. Clearly this was not an engine for a motor car, but even more clearly it had all the elements needed for a successful motor car. It only needed to have each element refined, lightened and increased in capability. Here was the future power plant for the motor car.

Feeling the Public Pulse

But another element intervened—the public was not ready. I know it is supposed that an inventor invents just as a hen lays eggs, that is, with no regard to the demand, but such is not true. I felt of the public pulse for fully 5 years before I decided that it would be ripe for the goods by the time I could get the problem worked out; then I was fully 5 years too

"Calling his attention to the fact that the clatter of the horse and buggy trotting alongside was a bedlam by comparison brought the further sage reply: 'Oh, but it is a different noise'"

soon, as history now shows. No safe, sound and conservative business man would consider such a thing as a horseless carriage. It would damage his standing in the community to associate with a crazy inventor, particularly on such a hopeless subject. The man who believed in such a foolish thing was almost as badly cracked as he who thought that "some day" men would fly. The subject would not down, however.

Copeland fitted small steam motors, mere toys, to bicycles and tricycles. The makers of the Star bicycle built a steam three-wheeler, which, probably weighed 1,000 pounds. A Washington man came to me in '88 for advice and assistance in building a steam buggy. I advised against it, but helped. Before it was finished he died suddenly.

Experiments of this kind on both sides of the water were slowly breaking down public prejudice. In 1891 I decided to make a start on a gasoline buggy and work began. But it was kept under cover. So secretive were we that men in the adjoining shop thought the rapid exhausts without a muffler were from a machine gun. There was nothing to hide, for nobody wanted anything I had, but there was no use proclaiming one's lunacy broadcast. Even as late as 1893 the tests and runs were made in vacant lots behind tight fences or on back streets and country roads. This avoided some of the ridicule. And when we had demonstrated success where horses could not keep up, as in the Times-Herald race of 1895, with 18 inches of snow on the roads, we still had this same unreasoning prejudice to fight. Electricity then was working wonders. The trolley car had crowded out the horse.

"We begged more than one electrical concern for ignition devices, but none could see any money or future in such work"

Many Scoffers Encountered

Electric cab companies were soon to kill the public service horses and everybody, without thinking, assumed that electricity would soon do everything. When we approached a man to sell him a vehicle or stock in the enterprise and told him we had a horseless carriage his first question was: "Electric?" To answer, "No! Gasoline," was to kill his interest at once. Even the officers of the electric cab companies were no better. With tire bills and battery repairs eating them up, they could see nothing better. They had to wait 10 years before they could see that the lighter gasoline cab was preferable.

Truly, there is nothing so hard to fight as prejudice. To fight poverty and provide for his family while spending every dollar that can be raked together to further the development of the mechanical device on which he is working is an easy task for the inventor compared with the breaking down of the foolish, irrational opposition which he meets from those very people who pride themselves that they are the guardians of the only real sense the public possesses. Instead of being open and alert and ready to use their trained minds to consider the new thing and judge it on its merits, the average man refuses to even look at it for no other reason than that it is new. Instead of helping the baby to grow to value he retards progress by smothering it and will hardly accept it after it has proven its value. He will go on buying things which are not suited to his needs just because his grandfather did or because his neighbor does. His actions show that he does not think—he imitates. He is not a rational being but just simply an ape. From the kid on the street to the comic paper of national circulation, the new thing, no matter how good, gets only abuse, mud and ridicule. The economic loss to the world because of such reception of the new doubtless is beyond calculation.

Ridicule Is Feared

Many men with good ideas are deterred from bringing them out simply because they fear this senseless opposition. The inventor who dares to step well to the front becomes at once a martyr for his beliefs. If he is strong enough to alone fight this opposition and win, then he is likely to get his reward. But why should the opposition exist? "'Eave a 'arf brick at 'im, Tam; 'e's a stranger," is a sentiment not confined to the ignorant English hoodlum. The man who shoots harmless birds to show his skill as a hunter and the man who condemns advanced ideas because they are new, both are of the same breed—they need education.

Not only the opposition but the nature of it was memorable. A man with his stable almost against the rear of his house, his horse tied in front, a pipe in his mouth, and an oil stove on his floor, would tell us about the odor objection and think he was talking intelligently.

"Why, we could not live in this city if 500 of those things were running about," he said.

I have had men complain of the smoke the motor cars emitted, when really their cigars had it beaten by 100 per cent. And the noise was a really and truly bugaboo. Just how much capital was scared away from the business in those early days by less noise than a horse makes with his hoofs I never will know. With air tires and double muffler, so that the demonstrator could hardly be heard and would pass for a quiet rig today, I have had Mr. Wiseacre say, "Oh, I don't like that. It is too noisy." Calling his attention to the fact that the clatter of the horse and buggy trotting alongside was a bedlam by comparison brought the further sage remark, "Oh, but it is a different noise." Truly, there is no accounting for tastes.

Ignorance of the Public

The horse user who blamed the motor car because his horse scared was too numerous to mention, nor did his ravings elicit much attention because of an experience with his kind in bicycle days. The rows of gaping mouths that we left behind as we went through a town for the first time never will be forgotten.

More than once when about to pass a vehicle the occupants would tumble out literally in their haste to get to the safety

of the roadside even though their horse was sound asleep and never woke up. The ignorance and lack of faith made itself felt in other ways. If a piece of iron or a pound of screws was ordered, it came along without question, but let it be known it was wanted for a horseless carriage and it came C. O. D. We begged more than one electrical concern for ignition devices, but none could see any money or future in such work. Foundrymen hated our casting jobs and machinists did not believe the thin walls of the cylinders would stand the explosions. That a gas engine could be throttled was so contrary to all teaching that one buyer fitted a brake to the flywheel and proceeded to control by brake instead of throttle. The engines were so uncertain that we fitted them all with peep caps, which could be removed to inspect the spark and test the mixture. The idea was a good one, but whiskers and eyebrows suffered somewhat when an occasional explosion sent a stream of flame into one's face.

Designing the Body

Customers objected to the shape of the vehicles far worse than they do today. They were disappointed if it was the least bit different from a horse vehicle in appearance. They seemed to want a handle bar for steering, a push button for control and to expect that a few dry cells and a fan motor carried in one's pockets would suffice to propel. Dashes were at first used, because we had no other device for the body front and they served to keep the wind from one's feet and skirts. But suddenly the edict went forth that a dash was a relic of the horse and like wildfire it was tabooed. A few rigs were built by some makers with an open front, but they were not run far nor used long that way.

Makers also went wrong in other respects. Two steps often were needed to permit the rider to reach the seat on top of the junk pile. One good friend of mine used to inquire from his lofty perch: "Isn't it awful dusty down there?" His rig was as short as it was tall and the way it would skid at every opportunity and head for everywhere but the road was frightful. He still is in the business, but he now rides as low as his friends.

There are good reasons why a motor car should be long and a horse vehicle short, as anyone can find out by experimenting with a wheelbarrow for a few minutes, but there are many features about the buggy which have been proven good for years, and until human beings change they will continue to be good. Rejecting them for some unproven form just to get a different thing is certainly not wise. The light powerful engines we had to build to get results in the motor car were fine for boat use, but there also we found opposition. The square sterns and other modern features were objected to just as strenuously as the motor car forms. When my little 18-foot tub, worth about $500, would run for miles alongside a 33-foot Daimler which had cost several thousand, the owner would get so mad he failed to recognize me for a whole week. Buyers did not expect to get the mileage promised them, even though the boat was built under a guarantee, and were simply speechless when a good margin was shown. Such lack of faith made it hard to get decent prices.

Inconsistency of Buyers

Nor was shape the only thought in the buyers' minds. Gasoline was classed with dynamite in most people's category. And the laughable part of it was that only a year or so later the same woman who would not get into a gasoline motor car would ride in a toy steam car with a tank of fuel under pressure at her feet and an open flame just a few inches from her skirt hems and do this although it was well known that too often the flame would flare up and scorch the car body. That she was sitting over a steam boiler in addition seemed not to matter. Verily, the car buyer is a synonym for inconsistency.

"Even as late as 1893 the tests and runs were made in vacant lots behind tight fences"

Of mechanical troubles we had legion. Warn a mechanic that the casting was light and must not be sprung out of shape while being bored and he would go ahead as if it weighed a ton and the cylinder would come out so badly sprung as to be unusable. Tell him that this was for a hot gas engine which would expand when working and he would take pride in fitting the piston so tight that it could not run when warm. High-priced tool makers were employed in order that all the available intelligence might be on the job, but it took much experience to show them that loose fits were the kind which did not give trouble.

Gas engine lubrication, like electric ignition, was a sealed book. No high-test oils were to be had. There were no batteries worth carrying. The few spark coils were cheap as could be.

Car for the Masses

The first market aimed at was that below the horse-user—to build a rig for the city dweller who could not afford the horse and buggy with its stable cost and nuisance. This meant simplicity and quantity. But how to get quantity when there was no market was a problem. Fortunately the motor car proved so much better than the horse vehicle that the wealthy took it up and the less financially fortunate have had to wait. Their turn is soon to come, for the motor is in sight that will meet their needs and their purses, and it does not have the imperfections in every detail that had to exist in the early days, simply because there were no perfected devices on the market.

"More than once when about to pass a vehicle the occupants would tumble out literally in their haste to get to the safety of the roadside, even though their horse was sound asleep and never woke up"

Automobile Board of Trade Launched

Constitution and By-Laws of Successor to the A. L. A. M. Adopted—Two Types of Membership Provided For—Dues Not More Than One-Tenth of 1 Per Cent on List Prices

NEW YORK, May 5—At a meeting yesterday, at which a constitution and by-laws were approved, the Automobile Board of Trade, recently incorporated and which will comprise the members of the Association of Licensed Automobile Manufacturers, together with other prominent builders of motor cars, was fairly launched.

The new organization will work for those various things that make for improved trade conditions, both as a whole and for the individual members, and is expected to be just as prominent a factor in the motor car world as was the A. L. A. M., whose place it takes.

The report and recommendations of the new directors, consisting of the following: Charles C. Hanch, Charles Clifton, Hugh Chalmers, S. D. Waldon, Benjamin Briscoe, Thomas Henderson and S. T. Davis, Jr., were unanimously approved.

Prior to the meeting of the board of trade there was a meeting of the A. L. A. M., with President Clifton in the chair, which was taken up with routine business. The following companies represented at yesterday's meeting all approved the plan of organization and the constitution and by-laws: Peerless Motor Car Co., United States Motor Co., Locomobile Co. of America, Pope Mfg. Co., Buckeye Mfg. Co., Metzger Motor Car Co., Selden Motor Vehicle Co., F. B. Stearns Co., Autocar Co., Cadillac Motor Car Co., Stevens-Duryea Co., Mercer Automobile Co., Pullman Motor Car Co., Corbin Motor Vehicle Corporation, Olds Motor Works, White Co., Reo Motor Car Co., Moon Motor Car Co., Chalmers Motor Co., Packard Motor Car Co., Premier Motor Mfg. Co., Oakland Motor Car Co., Moline Automobile Co., Jackson Automobile Co., Columbia Motor Car Co., Willys-Overland Co., Studebaker Auto. Co., Dayton Motor Car Co., Nordyke & Marmon Co.; Knox Automobile Co., Pierce-Arrow Motor Car Co.

The constitution is an interesting document. It provides for two classes of membership, manufacturing and representative, the former providing for concerns and the latter being for each concern's representative. The dues call for not more than one-tenth of 1 per cent of the list price of the vehicles sold, these payments to be made quarterly. The full constitution is as follows:

ARTICLE I

NAME OF THE CORPORATION

Section 1—The name of this corporation shall be Automobile Board of Trade.

PRINCIPAL OFFICE

Section 2—Its principal office shall be situated in the city of New York and state of New York.

ARTICLE II

OBJECTS OF THE CORPORATION

Section 1—The purpose and objects of this corporation are:

To foster the interests of those engaged in the trade or business of manufacturing motor cars and all other self-propelling vehicles;

To reform abuses relative thereto;

To secure freedom of its members from unjust or unlawful exactions;

To diffuse accurate and reliable information as to the standing of merchants and others dealing with members, as to all inventions, patents, processes or devices designed or intended for use in, upon or in connection with such vehicles and the manufacture thereof, as to the state of the art relative thereto, and as to the condition and development of the trade in which the members are engaged, in the United States and foreign countries;

To procure uniformity and certainty in the customs and usages of such trade;

To promote the construction of better highways;

To advocate the enactment of just and equitable laws affecting members;

To settle differences between members;

To promote a more enlarged and friendly intercourse among business men engaged in such trade or dealing with persons engaged therein;

To acquire by grant, gift, purchase, devise or bequest, to hold and to dispose of such property as the purposes of the corporation shall require, subject to such limitations as may be prescribed by law, including inventions, letters patents and processes, or rights thereunder, for the benefit of its members and not for pecuniary profit.

ARTICLE III

MEMBERSHIP

Section 1—Members of the corporation shall be divided into two classes, to be designated manufacturing members and representative members, respectively. Any individual, co-partnership firm or corporation actually engaged in the manufacture and sale of self-propelled vehicles shall be eligible for membership as a manufacturing member. Each co-partnership firm and corporation manufacturing member shall be entitled to designate, in form and manner prescribed by the directors, one member of such co-partnership firm, or one director or officer of such corporation, as the case may be, as a representative member, and upon such designation and the payment of a membership fee of $5, the person so designated shall be enrolled as a representative member. During the continuance of the membership of a representative member, the co-partnership firm or corporation so designating him shall not designate any other representative member.

TERMINATION OF REPRESENTATIVE MEMBERSHIP

Section 2—The membership of a representative member shall cease

(1) Upon the termination of the membership of the manufacturing member so designating him;

(2) Upon the revocation of such designation by such manufacturing member;

(3) In any event at the expiration of 5 years from his enrollment as a representative member.

VOTING POWER

Section 3—Each manufacturing member, whether an individual, co-partnership or corporation, shall be entitled to cast a single vote on each and every question at any meeting of the members of the corporation, which vote may be cast by the designated representative member representing said manufacturing member, if said representative member be present, and in the absence of said designated representative member said vote may be cast by any duly authorized agent or proxy of said manufacturing member. Cumulative voting shall not be allowed.

QUORUM

Section 4—At all meetings of the members of the corporation twenty-five members present shall constitute a quorum for the transaction of business, but a less number shall have power to adjourn to a future date, which date shall be stated.

ARTICLE IV

DIRECTORS

Section 1—The affairs of this corporation shall be managed by seven directors, who shall be members of the corporation, of whom at least one shall be a resident of the state of New York. They shall hold office for 1 year and until their successors are elected. The directors shall be elected annually at the regular meeting of members to be held on the second Tuesday of January in each and every year hereafter. Upon any director ceasing to be a member of the corporation he shall thereby cease to be a director, and the vacancy thus caused shall be filled by the directors. Said directors shall organize by the election of a chairman and vice-chairman, who shall be of their own number, and a secretary and treasurer, who need not be directors. The officers so chosen shall respectively be president, vice-president, secretary, and treasurer of the corporation. A majority of said directors shall constitute a quorum for the transaction of business. The directors shall make a report at each annual meeting of the members in accordance with section 11 of the membership corporation laws of the state of New York.

CONTRACTS

Section 2—No director or other officer of this corporation shall be interested directly or indirectly in any contract relating to the operations conducted by the corporation, nor in any contract for furnishing supplies thereto, unless expressly authorized so to do by the concurring vote of all the directors.

CONTRACTS INVOLVING OVER $10,000

Section 3—No contract for any purpose involving the expenditure of a sum of money in excess of $10,000 in any one matter shall be made or entered into by the officers or directors of the corporation, except upon the approval by a vote of at least two-thirds of the members present and voting at a regular or special meeting duly called and held as provided in the by-laws.

ARTICLE V

DUES OF MANUFACTURING MEMBERS

Section 1—The directors shall annually and at their first meeting fix and determine the dues to be paid by the manufacturing members during the current calendar year, which dues shall be in proportion to the sales of the manufacturing members, respectively, of self-propelled vehicles sold or otherwise disposed of by such member during the then calendar year; but in no case shall such dues be fixed or determined at a greater amount than one-tenth of 1 per cent of such sales, which sales shall be the list price of the vehicles sold, less the commission or discount allowed to dealers or to any retail selling branch controlled by the manufacturing member. The dues so fixed and determined shall be payable quarterly. Subject to the limitations herein provided, the directors may, subsequently to fixing the amount of said dues during the current calendar year, increase or diminish the amount thereof.

REPORTS BY MEMBERS

Section 2—Each manufacturing member shall render to the corporation within the first 15 days of January, April, July and October of each year, written reports under oath, setting forth the number and kinds of self-propelled vehicles made, and the number sold or otherwise disposed of, by such member during the preceding three calendar months, and the aggregate net amount charged therefor, not including, however, any sales of parts or any repairs, and shall within 15 days thereafter pay to the corporation on account of annual dues the just and true percentage thereof, not exceeding one-tenth of 1 per cent which shall have been so fixed and determined by the directors. A discount of 10 per cent shall be allowed to each manufacturing member if payment accompanies report within the time above specified. Each manufacturing member shall keep true and accurate records of the number and kinds of such vehicles made, sold or otherwise disposed of by it, and accurate books of account of all its sales of such vehicles, and shall permit a reasonable inspection thereof by the duly authorized representative or representatives of the corporation for the purpose of verifying any report so made by such member or obtaining the information required to be reported in case a member shall neglect or refuse to make such report, and such right of inspection for the purposes named shall survive the termination of membership of such manufacturing member.

ARTICLE VI

DEFENSES OF SUITS

Section 1—Upon advice of counsel of the corporation that it is for the interests of the members so to do, and upon the recommendation of the directors, approved by a vote of two-thirds of the members of the corporation present and voting at a regular or special meeting of the corporation called and held as provided in the by-laws, the corporation shall undertake the defense of any action or suit brought by a non-member against any manufacturing member thereof, based upon any patent claim or claims. The directors shall thereupon make provision for defending such action upon such terms and conditions relative to the control and management of the defense of said suit as the directors shall determine, and shall pay all disbursements and expenses, including fees of counsel, which shall be incurred in and about the defense of such suit; but such payment shall not include any sum awarded to the complainant by the decree of the court as either damages or costs.

SUITS NOW PENDING

Section 2—The benefits of this corporation as herein contemplated may be granted to its members in respect to patent suits and claims now pending against them as well as those which may hereafter be presented or prose-

cuted, to the extent only of any future proceedings to be taken.

ARTICLE VII

LICENSES AND SHOP RIGHTS

Section 1—Upon the acquisition of any patent or transferable rights thereunder, the corporation, so far as it shall have the lawful right to do so, shall, upon a resolution being adopted by two-thirds of all of the directors and duly approved by the affirmative vote of two-thirds of the members present, and voting at a regular or special meeting called and held as provided in the by-laws, grant to each then manufacturing member of the corporation in good standing desiring it, a license or shop right thereunder, upon such terms and conditions as shall be determined by the affirmative vote of two-thirds of the members present and voting at such meetings, but the terms and conditions shall be alike to each then manufacturing member; and grant to each subsequent manufacturing member of the corporation in good standing desiring it, a license or shop right thereunder, upon such terms and conditions as shall be determined by the affirmative vote of two-thirds of all the directors and duly approved by the affirmative vote of two-thirds of the members present and voting at such regular or special meeting.

ARTICLE VIII

DISSOLUTION

Section 1—Upon dissolution of this corporation the representative members shall not be entitled to participate in the distribution of the funds or assets of this corporation. Each then manufacturing member shall be entitled to share in the distribution of the funds and assets of the corporation in proportion to the aggregate amount of money paid by him to the corporation from time to time as dues or assessments.

ARTICLE IX

OBLIGATIONS OF MEMBERS

Section 1—The constitution and by-laws and any amendments thereof hereafter made shall be deemed a contract with the corporation and among the members, for the benefit of each and all, and shall be observed and adhered to by each member, and each member of this corporation by virtue of his membership covenants and agrees with the corporation and with each and every member thereof that he will observe, adhere to and be bound by the same.

ARTICLE X

AMENDMENTS

Section 1—This constitution or any article thereof may be altered or amended at any regular or special meeting of the members of this corporation by the affirmative vote of three-fourths of the members of the corporation present and voting. Notice of any proposed amendment shall be given the members at least 30 days prior to the meeting at which the amendment is to be considered.

PARIS BRANCH FOR PACKARD

Paris, May 2—Announcement is made here that the Packard Motor Car Co., of Detroit, Mich., U. S. A., has decided to establish a selling branch in Paris. The firm has been represented in this city by its European touring office, founded 4 or 5 years ago, but no attempt has been made up to the present to sell cars to Frenchmen. The new branch will be open within a month, a 1912 demonstration car being expected in Paris about the middle of May, in the hands of Demonstrator Hughes. For the present the company will retain its headquarters at 177 Boulevard Pereire, where R. N. Goode is in charge of the touring office. Later it is expected that a move will be made to larger and more centrally located premises.

The appearance of the Packard company on the French market marks a new era. Hitherto American firms have sought to obtain a hold of the French market with cheap cars, the cheapness being obtained by the construction of such series as are unknown to the European shops. The task never has been an easy one, and has been rendered still more difficult by the bad reputation secured by some cheap American cars sent over here 5 or 6 years ago.

Detroit Makers In Favor of Reciprocity

Representatives at Washington Informed as to Feelings of Car Manufacturers—Dominion Presents Promising Field for American Product—Changes Among the Michigan Tradesmen

DETROIT, Mich., May 8—Detroit manufacturers of motor cars are strongly in favor of reciprocity with Canada which will permit the product of their plants to be shipped into the dominion free from duty. Several of them have gone on record to this effect and have signified their desire to their representatives at Washington.

At present American motor cars are sold in Canada at an advance in price ranging about 30 per cent more than the figures in force in the United States. Some of the large Detroit factories support branch factories in Canada, to which parts are shipped, to be assembled on Canadian soil. The duty on parts is considerably less than that on completed cars, though this is balanced to a certain extent by the increased overhead and other expenses incident to the maintenance of an additional plant.

That Canada presents a most promising field for the American motor car is universally believed by the Detroit manufacturers, nearly all of whom already have cultivated the Canadian field with considerable success, despite the handicap of American goods in shape of a discriminating tariff.

Recent Trade Appointments

The past few days have signalized the reorganization of the publicity departments of two large factories. Crittenden Mariott, a magazine writer and an author of considerable note, has joined the staff of the Hudson Motor Car Co., and will take charge of the work of producing literature of various kinds. Charles A. Hughes, who has handled the Hudson publicity for some time, recently resigned to accept a position with a local advertising agency. President Neal of General Motors announces the appointment as publicity manager of F. W. Kurtz of Philadelphia. Mr. Kurtz has already taken charge of his new desk. He is now centralizing the efforts of his department in the manner which General Motors has generally adopted.

The Metzger Motor Car Co. has added L. L. Barnes, formerly southern manager for the Hudson Motor Car Co., to the sales department. E. E. Wright, formerly with the sales department of the Chalmers, has also accepted a position with the Metzger Co. and has been assigned headquarters in Indianapolis and Chicago.

Tuning Up Lozier Racers

An important appointment has been made by the Lozier, Harry T. Scott succeeding to the position of sales manager of the Detroit branch. He will be assisted by Robert L. Messimer and R. A. Whitehead. The Lozier company has had a special staff of men under Drivers Tetzlaff and Mulford, busy for more than a week testing out and tuning up the two cars which the drivers will pilot at Indianapolis. The cars were examined by Chairman Edwards of the A. A. A. technical committee during the week and have been in use on the country roads east of the city. They will be sent to Indianapolis shortly. Both are stock models of the 1912 type.

The Lozier sales department has been busy all week, entertaining the dealers of the firm who have gathered from all parts of the country for purposes of convention and to become thoroughly posted on the new models. The sessions of this convention are usually held in June, the present being rather in the nature of an informal gathering to allow the men who sell the cars to become acquainted with the new models and the new factory.

The Packard Motor Car Co. has begun a large addition to its immeuse plant on the boulevard. The new buildings will be devoted to an extension of the truck department. The additional room will allow the company to increase its production from 3 to 5 trucks a day. The new plant will include 9,695 square feet of floor space. In all probability part of the building will be devoted to the manufacture of public service vehicles.

The prosperity of the motor truck manufacturing establishments continues to be a feature of the season's business. The Alden Sampson Mfg. Co. is pushed to its limit and has its men working nights and overtime to take care of its orders.

The retail department of the Alden Sampson is being installed in the new building of the United States Motors Co. on Woodward avenue. This building will be given a formal opening this week, with the removal of the offices of the company from its old location on Jefferson avenue.

Formal announcement has been made by the United States Motor Co. of the delegation to Frank Briscoe of the duties of supervising director of its Detroit factory. Mr. Briscoe has been president of the Brush Runabout Co. and the Briscoe Mfg. Co. The change puts him in charge not only of these concerns, but the Alden Sampson and the Gray motor plants, as well as several associated concerns. Mr. Briscoe will maintain office headquarters in new United States Motor Co.'s building on Woodward avenue. His place as the active manager of the Brush company will be taken by C. S. Briggs, general manager.

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The Gasoline Problem

IT is generally imagined that the higher the Beaume test of gasoline the better and more powerful it is for use in motor cars. Gasoline testing 76 Beaume scale is imagined to be immeasurably better than 56 test, and 56 test is supposed to be superior to 55 test. This conception of the gasoline situation has arisen from the desire of the dealers to have a car that will start readily and one that they imagine will pick up and in driving parlance act very snappily. It is true that 76 test gasoline will do this better than 55 test; but it is also true that 55 test gasoline will give more power than the 76 test, because it contains more heat units. The more heat units in gasoline the more power will it produce.

NO better example of the misunderstanding existing regarding the merits of 76 gasoline as compared with 55 test can be cited than the racing experiences of last season. In some of the big races gasoline of 84 Beaume test was used in one or two cases, but it is remarkable to know that not a single car using such high test fuel won a single race. Other makers who had made a more careful study of the situation were using 55 test in their cars and were winning races every week with it. It is true it required a little more warming up with the 55 grade than with the 76, but once the warming up was accomplished the real work was done and the carburation of the 55 during the race was more successful than with the 86.

MANY dealers use gasoline of 74 Beaume test in their demonstrating cars, whereas no 60 test can be purchased in quantities in the cities where the cars are sold. It is questionable if any value is derived from the high test fuel. It behaves better when making a demonstration if starting with a cold motor. The sale may be made but often after the sale is made the owner has his unlooked for trouble when he starts using the lower test fuel in cold weather. Cases are on record where the carbureter adjustment was such that the car could not be started with the 55 gasoline, but acted perfectly when 74 was used. With changed carbureter adjustment this can be largely changed, making it possible to use the 55 spirit.

THE general talk that gasoline testing 60 or 55 Beaume is not fit for motor cars has been generally circulated, and only a week or so ago was a bill before one legislature of this country making it unlawful to sell gasoline testing lower than 66 Beaume in that state. The result of such legislation would have been disastrous, because it would have meant higher prices for fuel and greater cost in car operation. The high-test grades are sold at higher prices than the lower test grades and legislation of this nature would have worked a serious injury to a great majority of the car owners of that state. As it was, one or two motor car makers in that state were actually in favor of the bill, not being aware of the fact that they were trying to place statutes on the book that would soon prove an injury to their own business.

NECESSITY is the mother of invention and once it is generally understood that a 55 Beaume gasoline gives more power than a 74, carbureter makers will get after the solving of the problem of difficult starting in cold weather. Already several car builders are wrestling with the question. One concern has added a primary pump on the dash by means of which gasoline is sprayed into the intake manifold without having to pass through the carbureter; another concern links the pet cocks together and when they are opened by a pull button on the dash, gasoline is injected direct into the cylinders. Other car makers are adding hot air intakes to the carbureter, carbureter manufacturers are making these heated intake arrangements stock, and one or two concerns are now discussing the possibility of heating a portion of the gasoline by an electric coil to facilitate starting in the cold winter mornings. Where there is a will there is a way; and just as soon as the merits of the low-grade test gasoline are generally recognized there will be a widespread request for facilities whereby starting will be comparatively easy even in the coldest weather.

CLAIM is made that no longer can the motorist get the high-test gasoline to which he formerly was accustomed. Gradually the grade has been dropped. In the earlier days of motoring it was possible to get the 76; then the demand for the fuel became so great that it was dropped to 68. Again the demand increased in leaps and bounds until the refiners again were forced to drop and now it can be said without fear of contradiction that the general run of gasoline—in the west at any rate—is about 56. Still, this seems to be giving general satisfaction and few there are who notice the difference unless a test is made. Improvement in carbureter construction has made it easier to start a cold motor, so that along with this development the drop in the grade of the gasoline hardly has been noticed by the general run of motorists.

LOOKING into the future, one wonders what will be the status in another 5 years. Will the supply of gasoline be equal to the demand? Five years ago the big refiners would have said that there never would be any question as to that, but now they qualify this statement by saying that they can promise 5 years ahead. After that they believe that if the gasoline supply fails they will have discovered some substitute that will answer all needs.

PROBABLY the greatest factor in their calculations is the commercial motor vehicle. It is realized that this is the morning of the day of the power wagon, that in another 5 years there will be such a radical change in the transportation methods employed in this country that one necessarily would have to have the powers of a seer to attempt to predict as to the situation at that time. With the horse practically eliminated from the business world by that time there should be such a demand for motor fuel that the present product will seem infinitesimally small. How to meet this situation is the problem.

CHICAGO has billed for the near future a test which will give an accurate line on the fuel possibilities and probably determine to the satisfaction of the motoring world the capabilities of the various grades of gasoline. It is planned to start three cars of the same make and model, equipped the same throughout and using the same carbureter which will burn the three most popular grades of fuel—58, 63 and 68. The results, it is claimed, should show to the motoring world just what may be expected from each grade—whether the 58 is as economical as the 68. It is hoped to demonstrate that for general motor use the 58 is as good as the higher tests.

Planning Another Trail to Cross Iowa

Hawkeyes Launch Boom for Route From Mississippi River to Omaha, To Be Called Blue Grass Road

OTTUMWA, Ia., May 8—That the good roads movement in Iowa is on the boom is shown by the fact that in the past week another movement has been launched by the good roads boosters in the southern part of the state who are ready to announce the opening of another route across the state from the Mississippi river to Omaha, to be known as the Blue Grass road, so named by C. H. Thomas, of Kent, Ia., because it passes through the most fertile part of the state of Iowa. This will make the fourth route across the state, the others being the Hawkeye highway, starting from Dubuque; the White Post road, starting from Clinton, and the river-to-river route, which begins at Davenport—all ending at Omaha.

From the inception of the idea of having the fourth route across the state, the promoters have met with the greatest enthusiasm from not only the motorists but the farmers as well, and preliminary meetings in every city and town along the proposed route have been well attended by farmers, commercial club members and automobilists, all anxious to get started and make the Blue Grass route the best of any of the across-state roads.

Searching For a Start

Only one thing has hampered the opening of the road, and that is the starting point of the Blue Grass route along the Mississippi river. Three cities are claiming to be the best point from which to start the road, Burlington, Muscatine and Fort Madison. Muscatine's claims have been fostered by the motorists and the commercial club of the city putting forth promises of financial assistance and other recommendations. Burlington has its commercial club and motor car good roads boosters at work at their end of the line, while Fort Madison has not only had its commercial club members, motorists, Historical club members at work on their claims, but the farmers along the road have held meetings and have already started work dragging, grading and fixing up their roads in hopes that when the prospecting roads car comes through containing the officers of the road association they will be influenced in Fort Madison's favor by what has already been done on the road.

Ottumwa a Terminus

At present the eastern terminus of the road is Ottumwa, from which city the road goes west, following the line of the Burlington road through the prosperous and thriving cities of Albia, Charlton, Osceola, Red Oak and then straight into Council Bluffs and Omaha. In order to decide at which point along the river from which to start the road a party made up of President Joseph Long, of the Blue Grass Association, Malcolm McKinnon, of the Iowa Publishing Co., of Davenport, which is preparing the official guide book for the association, has started out to investigate the claims of the three cities and determine the best point along the river for the start of the road.

The road to Muscatine from Ottumwa by way of Fairfield has been inspected by these officers because it has a bridge across the Mississippi, but owing to the fact that there are no good roads connections in Illinois it seems doubtful if the route will start from that point. The car now is on its way to Burlington, but it is doubted by motorists in this section that the end of the route will be selected at that point, as there is no bridge across the river at Burlington, and tourists from Illinois wishing to get into Iowa or going east from here would be obliged to ferry across the river.

Fort Madison bases its claims to the river terminus of the road because of the fact that Fort Madison not only has a bridge across the river connecting with some of the best routes in Illinois which are used by tourists from Chicago and other eastern points wishing to go into Iowa, Nebraska, Missouri and Kansas, but the good roads boosters have laid out a route to join the main route into Ottumwa which 50 years ago was the main route across the state of Iowa.

This route is offered also for its historical interests and the Historical club of that city is lending its assistance, as it will prove to be a trip of intense interest to tourists and claim the route laid out by their boosters is the only route available, being the old Indian trail from Fort Madison to Ottumwa. This road reaches northwest on the watershed between the Des Moines and Skunk rivers and in the 68 miles crosses but one stream, which, even in the early days, was easily forded. Today there is only one bridge on the entire distance and has no hills. In the early trading days merchants all over the west used this trail in bringing their goods from Keokuk, where progress up the river by boats was impeded by the rapids at that point. Also with good hotels Fort Madison furnishes an interesting point as a stopover for tourists, for a few miles down the river on the Illinois side the tourist can take a day off and visit the old Mormon headquarters at Nauvoo, which later became a French settlement of considerable prominence in Illinois' history. Old settlers in this vicinity claim that 50 per cent of the people from eastern points intending to settle in Iowa or other places west of the Mississippi river came up the river this way or were ferried across the river at Fort Madison after arriving at the village which existed in those days across the river from this point, which was then the western terminus of the old government road across Illinois. These settlers on their way to the west took the road now proposed for the Blue Grass road and nearly every mile of the road to Ottumwa has some historical connection of interest to the latter day motorists.

Co-operation Suggested

In case there is no decision as to one of these cities being selected as the eastern end of the road, it is proposed that the three cities, Burlington, Muscatine and Fort Madison, each establish a highway to meet at Fairfield.

ANOTHER ROAD PROPOSED

Washington, D. C., May 6—Washington motorists are working hard to bring about the enactment of a bill introduced in congress by Representative Jones, of Virginia, to establish a national highway from Washington to Fredericksburg, Va., by way of Mount Vernon. The road is to be known as the Motor Washington memorial highway, in memory and in honor of George Washington. The bill, which carries an appropriation of $100,000, directs the director of public roads to designate from his office one chief engineer and the necessary assistants to make the surveys needed to build the highway. It is to be 100 feet wide, of standard macadam construction, with the necessary bridges, culverts and guard walls.

At the present time Mount Vernon is practically closed to motorists, as the road leading to the former home of George Washington is one of the worst roads in this section.

RECRUITING IN NEBRASKA

Omaha, Neb., May 8—Following a trip of D. E. Watkins, secretary of the Nebraska Automobile Association, through the state last week, two more clubs joined the state association. The two new ones are those of Lincoln and Auburn. Mr. Watkins is out on another tour of the state, and expects to get more clubs into the organization. It is hoped to have a membership of 10,000 in the state association by next year.

The principal aim of the Nebraska association, now, is the building up of good roads. The new law provides that the registration fees go, for good roads, to the county in which the owner resides. Consequently, the association plans to ask the commissioners of each county to pick out a main road from the county seat to adjoining counties, and keep this well dragged and in good condition with this money. It also is hoped to have concrete sign posts erected throughout the state.

Reach End of the Reciprocity Trail

Glidden Pathfinders Finish at Ottawa and Report Good Roads and Excellent Hotels Along the Route Which Takes in Many Points of Interest, Including Some Historic Battlefields

NEW YORK, May 6—The Glidden reciprocity tour pathfinders have found the path from Washington, D. C., to Canada. Dust-covered and happy the party reached Ottawa Thursday, having picked the route for the contest which will leave Washington June 19.

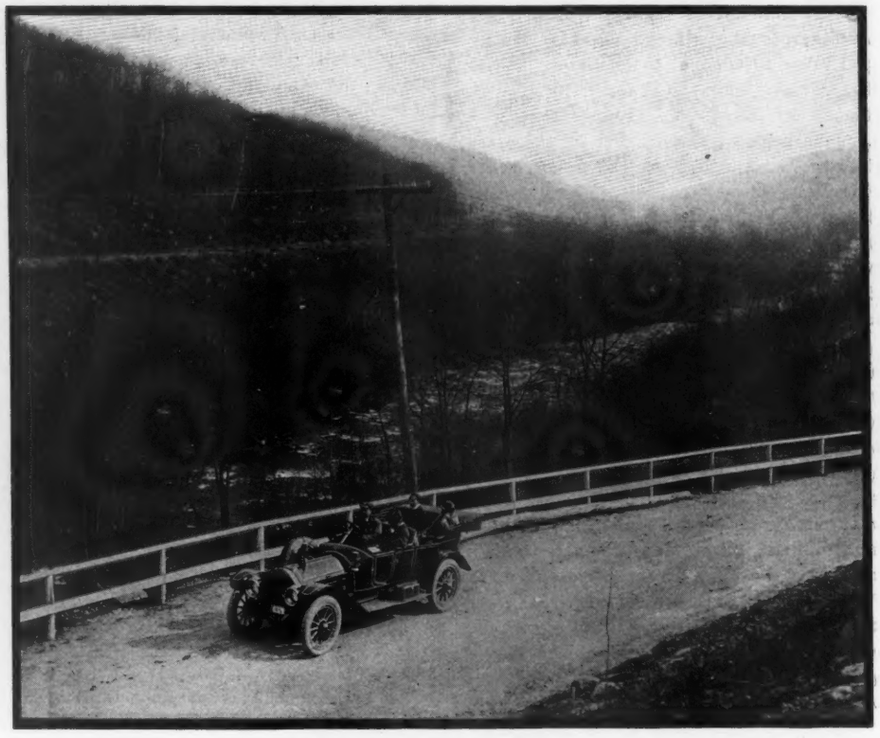
Longstreth, Butler, Ferguson and Lazarnick encountered varied weather on the trip, balmy sunshine, wind, rain, hail and snow. The trip from Montreal was made through a heavy snow storm and the weather was freezing cold.

A number of prospective entrants have made inquiry regarding the matter of getting their cars through the Canadian customs house when crossing the border. In this respect there will be nothing to worry about, for that will all be attended to by the contest board. There will be no red tape or delay in getting through.

Excellent hotel service has been encountered by the pathfinders all along the route. A hearty reception was accorded the pathfinding party in every town and city through which they passed. The Hartford Automobile Club met the pathfinders and escorted them into Hartford, and at Springfield, Mass., the Springfield Automobile Club entertained the crew at luncheon. When the tourists reached Boston on Thursday they were welcomed by the Bay State Automobile Club and by Mayor Fitzgerald and Charles J. Glidden, donor of the trophy that bears his name. In a short speech Mr. Glidden said he believed that the 1911 contest, which will include a hill-climb en route, will be the best ever held, in that it shall pass through the big eastern cities of America and will help further the reciprocity movement and will materially assist in the building of good roads between the United States and Canada.

From Boston the pathfinders wended their way over the historic battlefields of revolutionary days, passing through Lexington, Concord and other towns that now bear landmarks of many a volley and skirmish between the red coats and the colonists. The pathfinding car rolled through Fitchburg, Mass., thence over the boundary line of Massachusetts to Keene, N. H., up the Connecticut valley to Montpelier, Vermont. From here it continued on to Burlington and along the picturesque Lake Champlain for several miles, swerving over a long bridge onto Grand island, which is in the center of the lake. Several bridges were crossed before the party reached Rouse's Point, which is close to the boundary line of Canada and the United States. When the crew reached Montreal they were heartily welcomed by the Automobile Club of Canada. At Ottawa the city threw open its gates and the reception was hilarious.

Never before have the residents of a region for the projected route of a Glidden tour contest been so assertively enthusiastic about the event, and never have there been so many cities clamoring to have the cars pass through them than is now the case between Washington and Ottawa, the start and finish of the contest. Chairman Butler and Pathfinder Longstreth are being beseiged by letters from various boards of trade and city councils which indicate the extraordinary popularity of the tour this year. Many want the contestants to stop overnight at their city and are promising all kinds of entertainment if their requests are granted.



GLIDDEN PATHFINDERS IN PICTURESQUE SPOT NEAR PALMER, MASS.

FEDERATION HOLDS ELECTION

Philadelphia, Pa., May 5—The annual convention and election of officers of the Pennsylvania Motor Federation, a hustling young organization that in the comparatively short period of 5 years has grown until now it consists of half a hundred of the leading clubs in the state, and numbers in its membership many persons not directly identified with any motoring organization, were held here today at the headquarters of the Automobile Club of Germantown. Many prominent Pennsylvanians are actively connected with the federation and it is one of the strongest organizations of its kind in the United States. The improvement of existing roads, building and maintenance of first-class highways in all sections of the state, the supplying of general information to tourists, obtaining federal aid in the building of national highways in Pennsylvania, additions of toll-gates, the protection of motorists from drastic legislation and the furtherance of motor racing along legitimate lines, demonstrate the scope of its interests. In addition, the federation is lending a hand in the effort to establish the proposed Lincoln memorial highway from Washington to Gettysburg.

Nearly 100 delegates, representative of forty of the state's leading motoring clubs, attended the meeting today and listened to reports made by the several committees, the convention concluding with a ride through Fairmount park and a banquet at the Racquet Club tonight. President Robert P. Hooper presided over the meeting.

The passage of State Senator Sproul's highway improvement bill was approved as originally framed, but strong objection was raised against amendments tacked on in the lower house of the Pennsylvania legislature increasing the mileage of the roads proposed to be improved by 60 per

Speed Battle Attracts Star Drivers

Late Entry of a Third Benz Makes Total of Forty-Six Cars in 500-Mile Race at Indianapolis—Harroun Also In Contest —Louis Chevrolet Will Be Relief Pilot on the Buick Team

NEAR SOUTHINGTON, CONN., ON THIS YEAR'S GLIDDEN ROUTE

cent, claiming that the surplusage would kill the very object for which the bill was framed by reason of the excessive cost.

Several clubs were elected to membership in the federation, including the Automobile Club of Warren, the Corry Motor Club, the Slatington Motor Club, the Vandegrift Motor Club, the Clinton County Automobile Club and the Chambersburg Motor Club.

All the old officers were re-elected, as follows: Robert P. Hooper, of the Germantown Automobile Club, president; vice-presidents, John A. Wilson, Franklin, Pa.; Peter A. Meixell, Wilkes-Barre, Pa.; Powell Evans, Automobile Club of Philadelphia, and W. R. Stephens, Automobile Club of Wilkinsburg; secretary and treasurer, Paul C. Wolff, of the Automobile Club of Pittsburg.

ENTER FOUR-LEAF CLOVER RUN

Washington, D. C., May 9—Nineteen cars make up the field of the four-leaf clover run of the Automobile Club of Washington, the entries closing last night with that number of nominations. The entries are two Buicks, two Washingtons, two Reos, Stoddard-Dayton, Krit, Cole, Regal, Apperson, White, Maxwell, Columbia, Velie, Ford, Hudson, Warren-Detroit and Marion. The run starts next Monday.

INDIANAPOLIS, IND., May 8—Practically every driver of prominence in the United States is entered in the 500-mile international sweep-stakes to be held on the Indianapolis motor speedway May 30. One by one, the big drivers who have retired from the game have come back, unable to resist the opportunity of driving in the greatest race the world ever has known.

The post-entries of two Benz cars by Ernest Moross brings the total number of entries to forty-six and assures the fact that Bob Burman will be seen in the race. While the driver for the second car has not been named, it is believed Charles Patschke will be at the wheel of a Benz.

Even Louis Chevrolet will be in the race, after having retired from the game some months ago. He will serve as a relief driver for A. Chevrolet and Charles Basle. Ray Harroun, who has been manufacturing aeroplanes, is coming back for a day to drive a Marmon. There is another Cole driver to be named, and Bill Endicott, who is now leading the simple life of a farmer, will be on this team.

About the only big driver who has retired and who is not coming back as a driver, is George Robertson, who will look on from the side lines as assistant official starter to Fred J. Wagner. John Aitken, who has been out of the game for a while, will drive his old love—a National.

The speed trials to qualify for the event will be held Saturday, May 27. Each car must show a speed of 75 miles an hour for ¼ mile to enter.

It is reported, although not confirmed, that the management will give the prizes for the race in a unique manner. A local jeweler is authority for the fact that each of the cash prizes for the event is to be given in the form of a gold nugget, enclosed in a leather bag on which will be a gold plate for the inscription of the name of the winner.

DAVENPORT HAS NOVELTY RUN

Davenport, Ia., May 8—One of the most interesting contests that has ever been managed by the Davenport Automobile Club was the novelty run to De Witt and return, which took place Sunday. There were thirty-two entries in all. The run was made to De Witt and return, 32 miles, none of the entrants knowing on what basis the awards were to be made, aside from the fact that it was known the car coming nearest to a certain set time would win. After the tour was completed the directors announced that the time set had been 2 hours 51 minutes for the 46 miles and that a Cadillac touring car, driven by Dr. W. L. Allen, had won, time 2:48. The club plans to hold more of these runs in the future.

The club now boasts 150 members, an increase of thirty since last year.

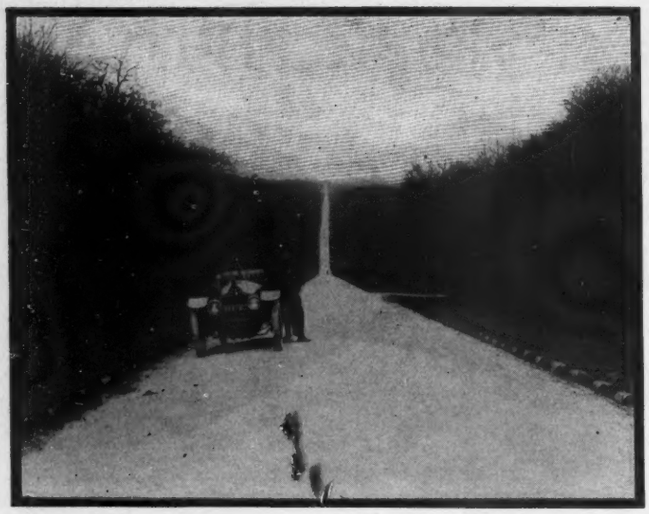
HOOSIERS ON TRADE TRIP

Indianapolis, Ind., May 10—About 200 monufacturers, wholesalers and jobbers, including many motor car men, all members of the Indianapolis Trade Association, left today for a 2 days' trade extension trip. Practically every motor car concern in the city, both manufacturers and dealers, are affiliated with the organization.

The itinerary includes the following cities and towns: Zionville, Whitestown, Lebanon, Frankfort, Mulberry, Dayton and Lafayette, the night to be spent in the latter city. Tomorrow the party will visit Crawfordsville, New Ross, Jamestown, Lizton, Pittsboro and Brownsburg.

WETMORE BANQUETED

New York, May 6—Motoring friends of John C. Wetmore, motor editor of the New York Mail, tendered the veteran a dinner last Wednesday night to celebrate his return from a European trip. Alfred Reeves, A. G. Batchelder, Duncan Curry, E. F. Korbel and R. H. Johnston were among those responsible for the affair. The Evening Wail, a burlesque paper, made the hit of the evening. Mr. Wetmore was presented with a watch by his friends.



STRAIGHTAWAY ON BOULOGNE COURSE

Eyes of Europe on Light-Car Event

Thirty-eight entries already have been paid in for the road race over the Boulogne-sur-Mer course, to be run Sunday, June 25, including Lion-Peugeot, Gregoire, Alcyon, Cote, Delage, Sizaire-Naudin, Arrol-Johnston, Sunbeam, Calthorpe, Excelsior, Fif and N. S. U.

BOULOGNE COURSE WINDING IN PLACES

SAVANNAH ATTRACTS BIG FIELD

Savannah, Ga., May 7—Forty-seven entries have been received for the endurance run from here to Charlotte, N. C., a distance of 392 miles, which starts Tuesday. One of the features will be a hill-climb at Columbia, the hill being 1½ miles in length.

When the run is completed it will make a new highway from Jacksonville, Fla., as far as Charlotte, the route from Savannah to Jacksonville having been laid out last year. It is the idea of the Savannah Automobile Club to complete a new highway from Jacksonville straight through to New York. The other end of the run will be gone over this fall when a run will be arranged from Savannah to New York, just as the Herald-Journal run when the New York to Atlanta highway was created.

The route will be some 300 miles shorter to Jacksonville than the trail by the way of Atlanta. The new highway when completed next fall either will be named the Great South and North highway or the Southern highway.

From Savannah as far as Charlotte, N. C., the Savannah Automobile Club has posted 158 signs which give the distance from one city to the other.

PARIS, May 8—Undoubtedly the most important race in Europe this year will be the light-car event to be run at Boulogne-sur-Mer on Sunday, June 25. It already has attracted thirty-eight fully paid entries, which in these days of anti-racing is a record to be proud of. The French firms are Lion-Peugeot, Gregoire, Alcyon, Cote, Delage, and Sizaire-Naudin; English, Arrol-Johnston, Sunbeam and Calthorpe; Belgium, Excelsior and Fif, and Germany, the firm of N. S. U. It will be seen that the big firms—such firms as Renault, Panhard, Darracq, Mercedes, Fiat, Benz, etc., which supplied the interest in the races of the past 6 years—are conspicuous by their absence. While they were of the opinion 5 years ago that racing was essential in order to give the necessary practical test to all improvements before adopting them on touring cars, since then they have changed policy and cannot be induced to take part in anything in the nature of a competition. Evidently the final test of racing which Louis Renault so stoutly upheld in 1905 and 1906 is not necessary in 1911.

Light Cars Popular

The success of the light-car race undoubtedly can be attributed to the fact that it is for light cars. The regulations limit the cylinder area of the four or six-cylinder motors—singles and twin-cylinders are excluded—to 3 liters, which is practically 183 cubic inches, and corresponds to that popular type of car having a bore and stroke varying between 70 by 170 and 85 by 130 millimeters. There are a few regulations regarding length of running board, width of the two seats, width of mud guards, etc., for the race is intended in a certain measure to be for standard, if not stock cars. This, however, only will tend to make manufacturers closely study the question of stream-line forms, and we probably shall see in the race some really original ideas in the nature of racing bodies. Several firms have made laboratory tests with models in order to determine the form offering the least resistance, and with the aeronautical experiments of the last 2 or 3 years there is plenty of material to draw upon. The race, however, will really be a test of small motors of 2.9 to 3.3 inches bore, with strokes in proportion. Under the rules it would be possible to enter a four-cylinder motor having a bore of 3.8 inches, but only on condition the stroke was the same.

Long Stroke Favored

Engineers are of the opinion, however, that even under a cylinder volume rule it is advisable to have a long stroke, and doubtless it will be found that the average in the race will be 3.3 by 5.1 inches bore and stroke. Normally such motors are rated in Europe at 12 to 15 horsepower, but it practically is certain that for the race few of them will brake less than 40 horsepower, while some of the extreme types will give a little more than 50 horsepower. More than one engineer admits that he will not be satisfied unless he gets more than 50 horsepower out of his motors on the bench test.

It is worth noting that there will be no six-cylinder models. A few of the firms entered for the race built these models, but they all are of the opinion that under racing conditions the six is at

Many Will Start In the French Race

Contesting cars, which will represent France, England, Belgium and Germany, are restricted in size, so that the race will practically be for 3.3 by 5.1-inch motors. Secured to drive these cars are many of the stars who formerly participated in the international events

FAST STRETCH ON BOULOGNE COURSE

SLIGHT GRADE IN FRENCH ROAD RACE COURSE

a disadvantage. With the exception of the Cote two-cycle, entered with a view to giving a demonstration of their reliability, all will be on the four-cycle principle. There will be one set of valveless motors, entered by the Alcyon company, of Paris, the motors being built by a leading Italian firm not taking part in the race. All the others will be of the poppet-valve type, some of the features being very large valves, with, in some cases, two exhaust valves per cylinder; lubrication throughout under pressure, and magnetos firing two plugs simultaneously per cylinder.

Star Drivers Secured

As there are no big car races this year, plenty of good drivers are available, and it is now possible for secondary firms to secure driving talent which a few years ago could only be afforded by the largest companies. Thus Alcyon has secured Louis Wagner, a one-time Vanderbilt cup winner. Delage has obtained Bablot, a former Brasier driver; Rigal, who last handled a big Bayard-Clement racer; Guyot, the winner of the last voiturette grand prix at Dieppe, and René Thomas, a motor cyclist, light-car driver, and now an aeroplanist. Peugeot will stick to its old team of Boillot, and Goux, with the addition of Zuccarelli, the Spaniard who won last year's voiturette race, and one other. Rigoly, once a world's record holder for Gobron, has joined the Excelsior team, together with Christiaens and Paul Riviere. Sizaire-Naudin cars will be handled by George Sizaire, his partner Naudin, and the chief tester, Lebouc.

Owing to the large number of cars, for it is expected that in addition to the thirty-eight already secured there will be half a dozen late entries, the course has been modified since last year, in order to cut out all the narrow portions and avoid all villages. It is true that there are faster courses in France, but probably none that is more suited for a light-car race.

Although having the imposing title of grand prix de France, the race to be held by the Automobile Club of the Sarthe, a fortnight after the Boulogne event, offers less assurance of success. The club is to be congratulated on its determination to carry the race through, despite the indifference of the Automobile Club of France, but it has made the mistake of putting on foot an event appealing to the big firms. An unlimited power racer might be built by such firms as Panhard, Renault, Mors, etc., but these are just the firms refusing to race under any conditions. The result is that the grand prix has only secured entries from Lorraine-Dietrich, Rolland-Pilain, and Lion-Peugeot, with a vague hope of getting a team from America, and a possibility of securing some of the Boulogne men after their race. The result is sufficient to show not only the indifference but the opposition of the leading European firms to all speed events.

American Entries Promised

New York, May 8—W. J. Morgan has announced that he has secured four American entries for the French grand prix on the Sarthe circuit July 9. Three of them are Nationals which will be driven by Aitken, Merz and Wilcox, and the other is a Buick with Louis Chevrolet as pilot.

CINCINNATI CLUB CELEBRATES

Cincinnati, O., May 7—The tenth anniversary banquet of the Automobile Club of Cincinnati, held in the banquet room of the Gibson house Thursday night, was the most successful affair of its kind ever given by the organization. The guests, 150 out of the 1,200 members of the club, included many of Cincinnati's wealthiest residents. The slogan adopted at Thursday's banquet is "2,000 members before the year of 1912."

The annual meeting and election of directors of the Cincinnati Automobile Dealers' Association was held at the association headquarters last night. The following directors were elected: Edward F. Herschede, Edwin F. Kruse, Robert C. Crowthers, W. G. Welbon, H. S. Leyman, Frank H. Miller and George Behlen. The only change was that of Mr. Behlen, who succeeds H. T. Boulden, who retired from the local field to become general sales manager of the Ohio Motor Car Co.

All expectations have been exceeded by the officials of the Cincinnati Automobile Dealers' Association in the matter of entries for the first of the series of races to be given at Latonia racing track on May 13-14. About twenty cars are in.

Five Types of Front-Wheel Brakes

England is the greatest advocate of front-wheel brakes in the motoring universe; in fact little is known about them elsewhere. In the United States, though, the inventors are awakening to the possibilities of the device as is shown by the patent office reports. In England there are five different styles of front-wheel brakes, made by concerns which have adopted them as standard.

The front-wheel brake affords twice the braking area, relieves the rear wheels of considerable strain, saves tires, and perhaps aids in the prevention of skidding. The great objection to the idea is the cost, although it is asserted by the English that everyone admits the efficiency of the device.

By J. S. Critchley

THOUGH many problems have occupied the minds of motor-car engineers during the past few years, not one of them can, it is thought, be considered of such vital importance as that which refers to the application of brakes to the front pair of wheels of the motor car. Actual details and principles of brakes themselves have exhibited only quite insignificant improvements and motor engineers apparently have realized that if advance was to be made—and that some advance was necessary will be clearly demonstrated later—it would have to take the form of braking the leading wheels of the car in addition to the driving wheels.

Question of Braking

It is clear that so soon as brakes of sufficient power—whatever the number or the extent of the surfaces acted upon may be—to skid the driving wheels under fairly dry road conditions are fitted, any further brake application is entirely useless and it is to be imagined that it was with this fact in mind that the designer of the first practical front-wheel braking system set to work to attack the problem. Having applied all possible braking effort to one pair of the four wheels of the car could not this braking effort be much increased, if not doubled, by further application to the second pair of wheels?

It is a fact, however, that given correct design the front-wheel brake can show so many advantages over the rear-wheel type that in the most up-to-date car the latter brakes are used for emergency only or in any case merely to absorb some of the car's momentum on steep inclines and thus to divide the braking strain.

Some of the Advantages

It will be well here to enumerate some of the advantages briefly referred to.

In the first case it may not be at once recognized that although the rear wheels are beyond doubt more suited to transmit the drive than the front wheels, the latter are just as much and for a practically identical reason more suited—by means of braking surfaces—to absorb the momentum of the car. For, consider the case of a car descending a steep incline, it will be realized that the center of gravity is advanced and hence more weight is concentrated upon the leading wheels. The sharper the incline the larger is the proportion of weight of the entire vehicle which is thrown on to the leading wheels until a point is reached—obviously never in practice, however,—where all the weight falls upon the leading wheels. In dealing with the rear wheels the exact obverse is the case, or to be clear, the steeper the incline the less weight is there on these wheels. Here, then, is one very desirable quality of the front-wheel position for the brake.

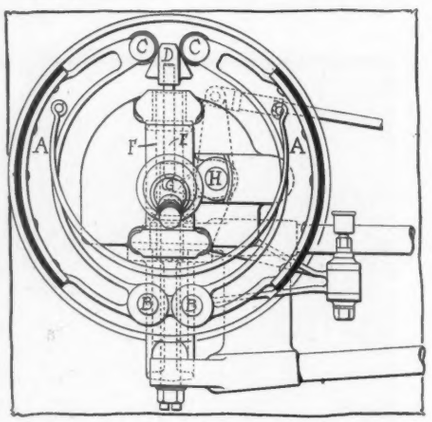


FIG. 1—THAMES FRONT-WHEEL BRAKE

Without doubt the property which most excels in the front-wheel brake is the corrective tendency it possesses towards side slip. This tendency has been borne out by all users of cars with these brakes attached and has been established beyond dispute by no less a body than the Royal Automobile Club of Great Britain, whose official tests proved that it actually checks side slip, due to either the negotiation of a curve or road camber.

Four Disturbing Factors

There appear to be four disturbing factors which may tend to cause side slip in the case of the rear wheels: Unlike co-efficient of friction between road and tires of the two wheels; unlike co-efficient of friction between the braking surfaces, uneven speed of revolution of the wheels due to the presence of the differential gear and the fact that the wheels are employed for the propulsion as well as for weight-carrying. In the case of the front-wheel braking system the two latter are entirely absent, which undoubtedly accounts in some measure for the superiority of this type of brake under conditions when skidding might be likely. It is, however, quite possible that the strongest factor in the case has to do only with the position of the braked wheels—whether they be in front or at the rear of the car, and the explanation is somewhat as follows:

Suppose a car to be negotiating a corner under greasy road surface conditions; the brakes being applied somewhat harshly the rear wheels are locked, but the momentum of the car has not been absorbed and consequently the rear wheels tend in the first case to slip forward, that is, in a direction the plane of which is parallel to the plane of rotation of the wheel. This

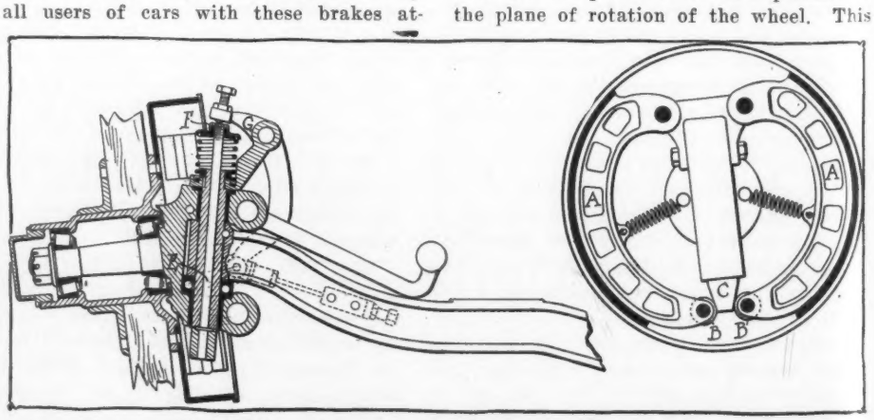


FIG. 3—AS THE ADAMS MFG. CO. SEES IT

direction is not, however, the desired direction of the car, for a corner is being negotiated and moreover that which started with a forward slip of the wheels soon develops into a skid or side slip by the momentum of the car, the rear and heavier portion slewing round on a pivot formed by one or other of the front wheels. This then is what apparently takes place when brakes are applied to the rear wheels.

Application to Front Wheels

Now in the case of a brake application to the front wheels in which the wheels are presumed to be locked a slip of the wheels takes place in just the same manner and direction as before, that is, the direction is that of the plane of rotation of the wheels; but in this case it is also the desired direction of the car so that there is no ill effect and by no means the same tendency to development into a skid or side slip.

Saving on Tires

From the point of view of tire wear the front-wheel brakes again score, for the effect of brake application to any wheel of a car is to throw the weight of the car forward, the more sudden the application the more forcible is the effect in this direction. As a direct result it will be clear that the co-efficient of friction between tire and road is increased in the case of the front pair of wheels and suffers a decrease in the case of the rear wheels. Greater braking power therefore can be obtained from front than from rear wheels, and as less wheel-locking takes place, greater immunity from tire wear. The proprietors of the Allen-Liversidge brake state that the owner of a private car after running for 2,000 miles on front-wheel brakes changed to a differential brake for a further distance of 500 miles, with the result that twice as much wear was found to take place during this latter distance as had occurred during the previous 2,000 miles.

Motor engineers will agree that though undoubtedly powerful, the differential brake is not particularly sound mechanically, principally because of the excessive strain—in many cases difficult to calculate and allow for—which may be thrown on several of the parts forming the transmission by careless or reckless brake manipulation. If for this reason the differential brake is to drop out of use its purpose is much better served by the substitution of brakes on the leading wheels than would be the case if duplicate brakes were fitted to the rear wheels, where the single brakes now fitted are usually sufficient to skid the wheels except under very advantageous road conditions.

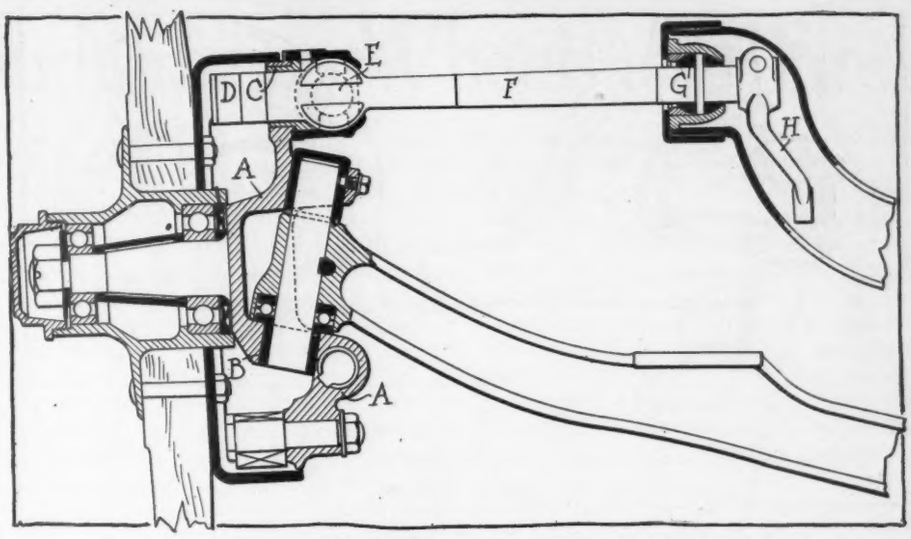


FIG. 2—THE ARGYLL FRONT-WHEEL BRAKE

Front-Wheel Brake Advantage

Before leaving the subject of the advantages of the front-wheel braking system it will be worth while perhaps to tabulate them briefly. Thus—

1—Greater immunity from side slip.

2—Greater braking power, twice the braking power being available in case of emergency.

3—As compared with the differential brake less wear and tear of transmission parts, which are expensive to replace.

4—Considerable saving of tire wear, due to the absence of wheel locking which pertains to the system.

5—Regular and smooth action under all conditions of use.

These five advantages constitute a very formidable and sufficient reason for the fitment of such brakes wherever cost of production will permit, for it is thought that it is first cost and first cost only that militates against the use of these brakes on cars of any design and power whatever. The brake necessitates, as will be seen by glancing at the diagrams on these pages, very careful design of the steering pivots, brake-operating levers, rods, etc., the design being necessarily such that the steering shall in no way interfere with the braking nor the braking with the steering.

One hears a deal of haphazard talk nowa-days to the effect that such and such a car has "very powerful brakes" and some are inclined to overlook the fact that the ultimate power of a brake depends solely on the degree of friction between tire and road. Now the friction between two rubbing surfaces bears a constant ratio to the force pressing them together, and the value of this coefficient of friction between rubber and dry macadamized road is .625, which means that if a car weighs say 1,000 pounds and its wheels are locked, a pull of 625 pounds will be required to move it along a level road surface.

Four Factors Involved

It can be shown easily that in the retarding or accelerating effect of a force upon a body in motion four factors are involved—the weight of the body—w; the velocity of the body—v; the accelerating force of gravity—g: = 16.1 feet per second; and lastly the external force—f. The space s traveled through by a moving body with a constantly applied retarding force is found by the formula

$$S = \frac{W \times V^2}{4g \times f}$$

And f here is the weight of the car multiplied by the coefficient of friction .625, so that the formula becomes by substituting this value

$$S = \frac{W \times V^2}{64.4 \times W \times .625}$$

Since w occurs in both numerator and denominator of the fraction it has no value. The formula then becomes

$$\frac{V^2}{64.4 \times .625} \quad \text{or} \quad \frac{V^2}{40.15}$$

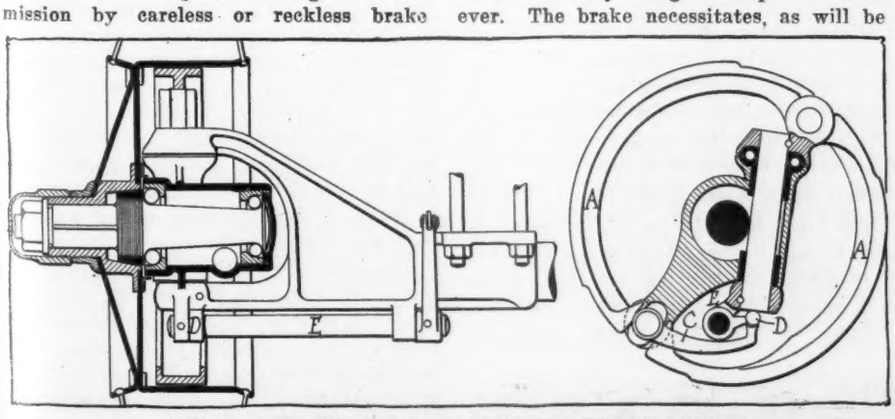


FIG. 4—A DIFFERENT TYPE OF FRONT WHEEL BRAKE

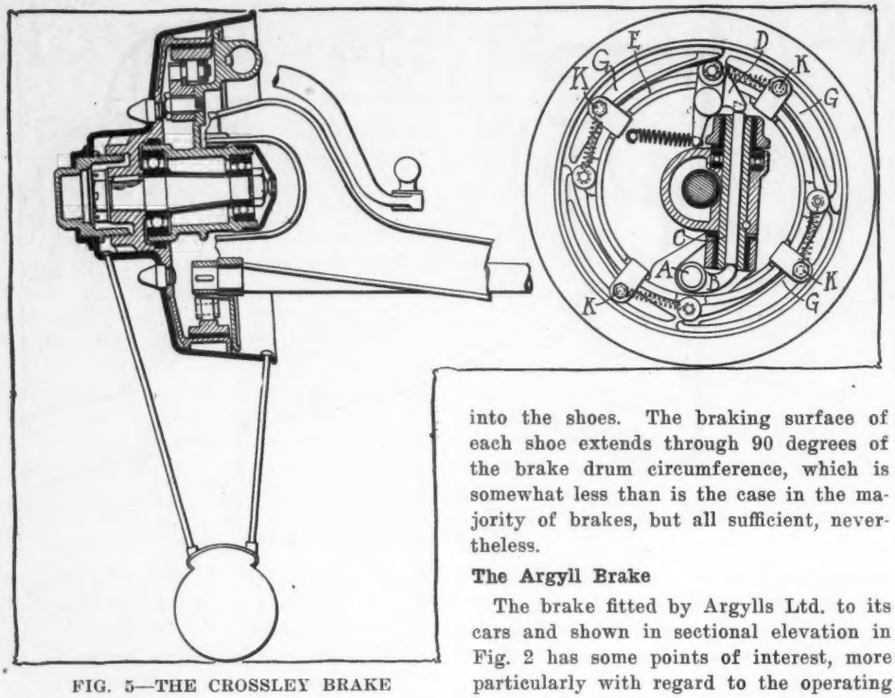


FIG. 5—THE CROSSLEY BRAKE

In words, then, the formula shows that the weight of the car has no effect on the distance to which it will travel after the wheels are locked by the brakes. It is the weight of the car which holds the wheels to the ground but for mathematical reasons it does not affect the distance required to pull up, and a heavy car is therefore just as easy to stop as a light one, provided of course that the wheels of both can be locked by the brakes.

Since the time taken to pull up any car by its brakes is a useful thing to know, its value can be calculated from the formula

$$T = \frac{W \times V}{2g \times f}$$

It will now be well to proceed with a description of some front wheel brakes fitted to well known cars. Fig. 1 shows a view of that fitted to the Thames car built by the Thames Ironworks Shipbuilding and Engineering Co. Twin curved shoes A A are pivoted at their lower ends B B and their upper ends are provided with rollers C C. A wedge-shaped block D rests between these rollers and is supported on the upper end of a pin E; the pin E is free to slide vertically in the hollow axle swivel F. The lower end of the pin E which extends to about the center of the wheel axle is engaged by the end of a short arm G fixed to the brake rocking shaft H. The rocking arm pressing on the underside of the pin when the brake is applied lifts the wedge-shaped block D and forces asunder the two rollers and the brake shoes to which they are attached. The shoes are kept from contact with the surface of the drum when the brake is off by a neat curved spring, the ends of which engage pins screwed into the shoes. The braking surface of each shoe extends through 90 degrees of the brake drum circumference, which is somewhat less than is the case in the majority of brakes, but all sufficient, nevertheless.

The Argyll Brake

The brake fitted by Argylls Ltd. to its cars and shown in sectional elevation in Fig. 2 has some points of interest, more particularly with regard to the operating mechanism, which is a very clever piece of design. The piece A which has bearings B B on which it swivels has a boss at its lower side to carry the brake shoe attachment pin and on its upper side a bearing C to carry the brake operating cam D. To the inner side of the cam is attached a universal joint E and it will be noticed that the center of this joint falls on the axis of the swivel pin. Any movement of the brake drum, shoes, etc., about the swivel pin as when steering causes therefore no movement in the universal joint other than a rocking one on its own axis. The universal joint E has a horizontal shaft F attached to it, the inner end of which shaft is supported in a universal bearing G attached to the inner side of the pressed steel frame. Thus, when the frame moves vertically in relation to the axle as when the springs come into play the universal joints E and C permit perfectly free movements of the shaft F. There is, of course, a slight swinging movement of the brake lever H from the center of the joint G, but as this must be only quite small and is in a plane at 90 degrees to the direction of pull it causes no trouble when the brakes are applied.

The not inconsiderable difficulties of applying a braking effort to a swivelling drum have in this design been overcome in a particularly ingenious and simple manner and the mechanism is, as might be imagined, the subject of a patent.

Adams Front-Wheel Brake

The front-wheel brake, Fig. 3, fitted to cars made by The Adams Mfg. Co. Ltd., is of simple construction, the brake shoes A A being of particularly heavy and rigid design. As is usual, they have rollers attached to their free ends, which are pressed asunder by a wedge piece C. Tension springs hold the brake shoes out of action when required. The pin E, which serves to operate the wedge piece, passes centrally through the swivel pin and has a hardened steel nose piece F and a compression spring at its upper end. The nose piece is depressed by a set screw on the end of a bell crank lever G, which serves by way of the usual links to operate the brake. The set screw, as will be seen, is adjustable, and allows for any wear which may take place in the shoes, and being in an accessible position, should prove useful.

The design of this brake is simple and straightforward and has perhaps fewer parts than any other; the fact that the relative movements of the brake operating pin and of the brake shoes themselves is not in the same plane is allowed for by the use of anti-friction rollers with some sphericity of their peripheries.

Another Type of Brake

Fig. 4 shows a type of brake which differs somewhat from those already described. In this case the wheels, which are wire ones, are vertical, and are not sloped and the swivel pins, which are on the same plane as the wheel tread, are not, of course, on the same center as the stub axles, and hence the swivel pins have a slope sufficient to comply with the conditions of pivotal steering. The brake shoes A A, which are of simple design and are not lined, are operated as is usual by a cam B attached to the lever C. The lever C has a slightly cupped free end which is engaged by a circular nose D of a short lever fixed on the brake shaft E; the brake shaft E being rotated by a lever at its inner end, as clearly shown in the figure. There is little that is remarkable in the design, however.

The brake applied to the front wheels of the Crossley car is peculiar in the respect that it has four shoes in place of the usual two and the method of operating them is interesting. The brake cross shaft A carries a small trigger piece B at each end, this operates upon the lower end of a pin C, which passes through the center of the axle swivel pin. The upper end of the pin operates the rocking lever D and gives a rotary movement to the circular cam E. The cam carries four rollers K and these act upon the under sides of the four shoes G and force them against the inner surface of the brake drum. When the brake is released, the cam—by way of the springs shown—rotates in an opposite direction and in so doing the rollers fall between the short overhanging ends of the brake shoes and tilt them out of contact with the drum.

The brake has rather a multiplicity of parts, but owing to the number of shoes employed a large proportion of the surface of the drum is in use at one time and this should tend to make for less liability to overheating. The brake is manufactured by the Crossley Co.

Report on Standardizing Wheels and Tires

NEW YORK, May 8—After holding several meetings, including conferences with tire manufacturers, wheel manufacturers and commercial vehicle manufacturers, the wheel dimensions and fastenings for tires division of the standards committee of the Society of Automobile Engineers has come to a definite decision and made its report as given below.

The report is subject to the approval of the whole S. A. E. standards committee, which consists of about eighty members at work upon the standardization of the whole field of motor vehicle manufacturing practice. The procedure to be followed in making this report a part of the final standards accepted by the S. A. E. is as follows: The recommendations appearing below are now being voted by the members of the whole S. A. E. standards committee. Upon affirmative action by this committee, the report will, after the approval of the society council, be submitted to the whole society membership for its acceptance.

It is interesting to mention here that while the initial undertaking of this project presented almost insuperable difficulties, when the commercial importance of affecting standard methods of wheel manufacture and tire application was completely set before those departments of the industry at interest, they immediately expressed willingness to coöperate even at considerable outlay for new methods or loss of present investment which was extremely gratifying and has practically assured the complete success which has attended the committee's effort. The tire companies which could probably not have been reconciled to uniform practices by any other means readily assented to the solution of the problem by such a qualified, disinterested and important body as the Society of Automobile Engineers.

Scope of Tire Makers' Operations

The tire manufacturing division of the industry has developed under such a diversity of practice that, instead of an open market and particularly the future market, most of the tire makers find themselves confined to a field of business restricted by the employment of their particular devices, and wherever this field could be enlarged this accomplishment was effected only by serious changes in the wheel equipment, which were expensive and ultimately a detriment to the user. By the adoption of uniformity in wheel structure the entire market among users is thrown open to every tire manufacturer, and this fact alone has proved sufficiently interesting to warrant almost complete new mold equipment and other radical changes in methods of manufacture, which though involving immediate heavy outlay, is certain to reduce the unnatural expense which has heretofore existed. Another consideration among the tire manufacturers has been that, due to the difference in cross-section and profile, some manufacturers have had a considerable competitive advantage over others. Standardization will effect a certain uniformity of tire cross-section or quantity of rubber employed per tire, which will in turn reduce competition to a more normal basis.

The foregoing considerations bring into prominence the fact that the ultimate consumer, or truck user, must finally bear the burden in price resulting from existing conditions, and therefore the effect of standardization will be to more readily promote the use of commercial motor vehicles in contributing to their reduction in cost. Aside from this prime consideration the user has the advantage of interchangeability with all makes of tires, which gives him the retroactive benefit of a broader supply of equipment with consequent commercial considerations which naturally follow. The committee's report is as follows:

Report of the Committee

As the result of six meetings of your committee since its appointment in January, 1911, a conference with the representatives of tire and wheel manufacturers, and considerable supplementary correspondence with these tire manufacturers and wheel and vehicle builders, your committee desires to make its final report on that division of its work relating to wheel dimensions for solid tires and, therefore, respectfully submits for your acceptance and approval its findings as expressed in the following resolutions passed at our recent meeting held in New York, May 4, 1911.

Resolved, that the wheel dimensions and fastenings for tires division of the standards committee recommend for acceptance by the Society of Automobile Engineers the following as standards for dimensions of wheels for solid tires:

Wheel dimensions for non-demountable tire equipment metal bands—There shall be a permanent metal band on all wheels in advance of shipment by wheel manufacturers.

This metal band shall be ¼-inch thick on wheels for single tire equipment up to and including 4-inch nominal width of tire; and ⅜-inch thick on wheels for single tire equipment above 4-inch nominal width of tire; and ⅜-inch thick on wheels for dual equipment of all tire sizes.

Wheel diameters—There shall be a constant wheel diameter over the metal band, for all widths of solid tires of a given nominal overall tire diameter. Nominal tire diameters shall increase or decrease from 36 inches by even 2 inches.

The constant diameter for a wheel taking a 36-inch tire shall be 30 inches over the metal band; and shall increase or decrease by even 2 inches for tires larger or smaller than 36 inches.

Width of felloe and width of band single tires—The width of felloe and band shall be ¾-inch less than the nominal width of the tire equipment for same. For example, the standard felloe width for 4-inch single tire equipment shall be ¾ inches.

Dual tires—The width of felloe and band for dual tire equipment shall be twice the nominal width of each of the dual tires. For example—the standard felloe width for 4-inch dual tire equipment shall be 8 inches.

Tolerance over metal band—The tolerance allowable in the circumference of metal bands shall be as follows, before application to wheel:

	Inch
Minus	0
Plus	1/16

After application to wheel:

	Inch
Minus	0
Plus	⅛

Minimum depth of wood felloe—The minimum depth of wood felloes shall be as follows:

Tire size Inch	Felloe depth Inch	Tire size Inch	Felloe depth Inch
2	1¼	6	2
2½	1¼	6½	2⅛
3	1½	7	2⅛
3½	1½	7½	2⅛
4	1¾	8	2⅛
4½	1¾		
5½	2	Above 8	2¼

For demountable tire equipment—All of the foregoing provisions for non-demountable tire equipment standards, viz.: equipment of wheels with metal bands, the constant diameter of wheel over metal band, the stated variations of wheel diameter, the width of felloe, the tolerance over metal band, and minimum depth of wood felloe, shall apply to wheels for demountable tire equipment.

Resolved, That this report be presented to the standards committee for its approval with the recommendation that, in view of the urgent commercial necessity for decision in settlement of the standards in question, a mail vote of the standards committee be taken and rendered promptly to the council of the society for approval as to submission to the entire membership for final acceptance.

It is the opinion of your committee that the ground has been thoroughly covered as to warrant a definite and final action without further delay, and that the commercial use of these standards should go into effect not later than January 1, 1912, as the intervening period appears to provide reasonable allowance for the manufacturing changes involved.

CALLS IT CUT-THROAT POLICY

SARGENT, Neb.—Editor Motor Age—I think the brother dealer of Blye Springs, Neb.—A. H. Krauss—has ably put prevailing conditions before the manufacturers in Motor Age of April 13. I want to endorse every word he said and add that it is not only bankers in lots of three that get net prices but I have the letters to show that farmers get net prices on single cars.

With over 20 years' experience in the implement business, I feel I can get some

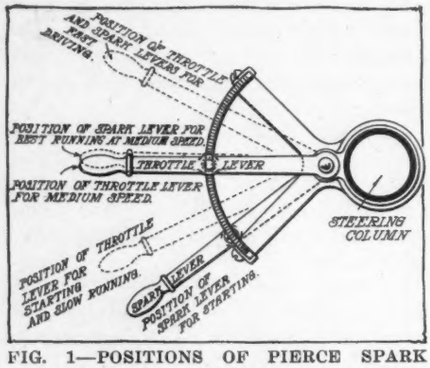

POSITION OF THROTTLE AND SPARK LEVERS FOR BEST RUNNING AT MEDIUM SPEED.
POSITION OF SPARK LEVER FOR BEST RUNNING AT MEDIUM SPEED.
THROTTLE LEVER
POSITION OF THROTTLE LEVER FOR MEDIUM SPEED.
STEERING COLUMN
POSITION OF THROTTLE LEVER FOR STARTING AND SLOW RUNNING.
SPARK LEVER
POSITION OF SPARK LEVER FOR STARTING.

FIG. 1—POSITIONS OF PIERCE SPARK AND THROTTLE LEVERS UNDER VARIOUS RUNNING CONDITIONS

business against honorable competition, but this cut-throat business robs me of not profit but pay for my labor. And some of the manufacturers are to blame, for they stand by and give their consent. As a remedy I offer the following:

Let the manufacturers organize; let the jobbers or state agencies organize; let the retail dealers organize by states; then let the three organizations confederate all for the purpose of improving trade conditions. This could be made effective. If something is not done very soon, the retailer of motor cars will be a thing of the past.—W. T. Cropper.

TO RENOVATE CHALMERS TOP

Rochester, N. Y.—Editor Motor Age—Through the Readers' Clearing House will Motor Age kindly advise me where I can purchase some preparation that will bring out the color on the inside of my top on a Chalmers 30? It is all discolored and faded.—W. K.

If this is a model M top, the lining can be cleaned with gasoline; but if it is a model K it is hard to say just what will restore the color, which originally was black.

ASKS ABOUT THE ELMORE

Aberdeen, S. D.—Editor Motor Age—Through the Readers' Clearing House will Motor Age answer the following questions?

1—How can I inspect and adjust the connecting rod bearings and crank bearings in an Elmore 36, 1910 model?

2—Is there any damage done to the crankshaft and connecting rods and its bearings by the gas compression, which constantly occurs in this type of engine?

3—I have noticed that this car is the most comfortable one I ever drove or rode in, regardless of price. Is this due to the extreme length of its springs to the weight of the car? The rear springs measure 54 inches, the front 38 inches.

4—Would a Schebler carbureter be practical on this type of engine? I thought possibly it would save gas.

5—Is there any way by which one of the dynamo and storage battery electric light systems could be attached to this engine? Kindly illustrate by diagram.

6—In starting this car I usually turn the starting crank three or four times, then turn on the switch and press the starting button. Is this more injurious than turning on the switch before cranking? I was kicked once or twice and prefer the present method if it will not hurt the engine.

7—How can the oil be drained out of the transmission case in one of these cars? I fail to find any plug in it any place.—A Subscriber.

1—Connecting rod and crank bearings of the motor mentioned can be inspected by removing the hand hole plates on the bottom of the crankcase. The crankshaft bearings can be adjusted by dismantling the engine and either placing shims under the bearing bushings or scraping off the surplus of the two halves of the crankcase which support them.

2—Motor Age has no record of any cases in which damage to the connecting rod or crank bearings has been done by the gas compression of these motors.

3—Easier riding qualities are the chief characteristic of longer springs and that is the reason why they now are in use on so many cars at the present time.

4—Motor Age knows of no case where the Schebler carbureter has been used on this type of crankcase compression engine, and therefore cannot give any authentic information as to the advantages attainable therefrom.

5—The dynamo could be connected up to the motor by means of a friction wheel or belt drive from the flywheel, by belt from a pulley on the propellor shaft or by means of a spur gear and chain from the propellor shaft. A letter to any of the manufacturers of this sort of electric lighting equipment will bring forth numerous illustrations showing many various methods of driving their equipment.

6—Your practice of starting the engine by turning it over a number of times before switching on the ignition current is, as you suggest, a very safe one and has no injurious effect upon the motor. Although the motor seems to start very suddenly it does not start with a jerk as is sometimes believed, owing to the flexibility of the gases in the cylinders, whose expansion generates the power that starts the motor.

The Readers' Clearing House

EDITOR'S NOTE—To the Readers of the Clearing House Columns: Motor Age insists on having bona fide signatures to all communications published in this department. It has been discovered that the proper signature has not been given on many communications, and Motor Age will not publish such communications, and will take steps to hunt down the offenders of this rule if it is violated.

7—The oil in the transmission change gear case can be drained out by removing the plug in the lower rear portion of it.

WANTS MOTOR CAR HISTORY

Parkston, S. D.—Editor Motor Age—Will Motor Age or some faithful reader of Motor Age give through these columns a history of the motor car?—E. J. Mueller.

The leading article in this issue of Motor Age deals with the early attempts at car building as remembered by Charles E. Duryea. A sketch covering the history of the motor car will be found in Self-Propelled Vehicles, by J. E. Homans, published by Theo. Audel & Co., New York. Any satisfactory history would require too much space for these columns.

HOW PIERCE CARBURETER WORKS

Davenport, Ia.—Editor Motor Age—Through the Readers' Clearing House will Motor Age kindly answer the following questions:

1—Explain the working of a Pierce carbureter and its adjustments. Kindly give a diagram if possible.

2—In my model 36, 1910 Pierce there is a knock or pound in or about the engine which I notice frequently when running along slowly where the engine has scarcely any work. Again it is noticed when the throttle is opened quickly. What is the cause of this and how can it be remedied?

3—Kindly explain the working of the Brush transmission.—Zim.

1—Fig. 2 shows a section through the Pierce automatic carbureter. The constant level gasoline chamber is concentric with the spray nozzle A, which is in communication with the gasoline supply tank, which is on a higher level. The float B is annular. This keeps the height of gasoline at the spray nozzle constant at whatever inclination the car may stand. This height is $\frac{5}{16}$ inch below the top of the nozzle, the opening in which is regulated by the needle valve C. When the gasoline gets below this level the float drops, raising by means of a lever the float valve D, and thus allowing the gasoline to fill up the chamber to its proper level.

The gasoline from the supply tank passes through the fine gauze strainer E. This prevents water and dirt from entering. This plug should be withdrawn occasionally to allow the water and dirt to be drained off. There also is a drain cock at the tank end of the pipe leading to the

Clearing House

EDITOR'S NOTE — In this department Motor Age answers free of charge questions regarding motor problems, and invites the discussion of pertinent subjects. Correspondence is solicited from subscribers and others. All communications must be properly signed, and should the writer not wish his name to appear, he may use any nom de plume desired.

carbureter. This should be opened once a month to drain off the water. When the engine is running slowly, the throttle valve F is just open, and the auxiliary inlet reed valves G and H are on their seats. The opening formed by the throttle valve is V-shaped, so that the suction of the engine induces a high velocity at this point. All the air is taken in at the lower inlet, and coming from the proximity of the exhaust pipe, is warm. It passes up the contracted passage around the spray nozzle at a high speed, and so vaporizes the proper amount of gasoline. When the engine runs faster the more intense suction opens the light auxiliary air reed valve G, and when running still faster it opens the heavy reed valve H also. This insures a gradual increase in the supply of air to the mixing chamber. The springs J act as stops for the valves. When these are once adjusted they should not be altered.

The wire gauze screen K around the auxiliary air inlet valves, should be removed occasionally and cleaned out. There is also a wire gauze screen on the funnel on the air pipe, near the exhaust pipe. This should be kept clean. If these screens become clogged with dust and dirt, the engine will not run properly.

There is a hot-water jacket L around the mixing chamber. The pipe M at the top has a cock in it which may be closed in hot weather, but should be full open in cold weather. The spindle N should be oiled occasionally. In hot weather the air regulator O should be opened fully to admit cool air around the spray nozzle, but should be closed in cold weather. The gauze screen in this should be kept clean.

2—This knock probably is due to having the spark too far advanced or to a too sudden opening of the spark or throttle. In Fig. 1 is shown the correct positions of both the spark and throttle levers. The spark knock is a sharp metallic sound and may also be due to premature ignition, caused by an overheated cylinder, or an overheated spark plug, or carbon in the cylinder.

3—The Brush transmission of the planetary type giving two forward speeds gives direct drive on high speed by locking the gears with a clutch, a type of multiple-disk clutch C, Fig. 3, being used. In this plan section of the gearset the shaft S connects with the motor and the pinion P transmits to the differential on the jackshaft, from which final transmission is by short side chains. This planetary set differs from many of this type in that it is completely housed in a case G and so may be packed with grease. It differs still further from the conventional planetary set in that friction bands are not used to hold drums from revolving to secure low speed and reverse but rather multiple-disk clutches are utilized for obtaining these speeds. The high speed multiple-disk clutch C consists of alternate sets of disks D and D1 which rest between vise-like jaws, one of which is formed out of the spider, and the other is in concentric relation, sufficiently spaced in the axle plane to afford room for the disks plus clearance when the clutch is not engaged.

For direct drive power must be transmitted from the shaft S to shaft S1 carrying the pinion P so that both will rotate at the same speed. On the end of the shaft S is keyed the spur gear P constantly in mesh with a set of three planetary pinions P1, and these planetary spur gears P1 are in turn constantly in mesh with an internal gear on the spider K, which spider is keyed to the shaft S1. To obtain direct drive the carrier H engaging the alternate sets of disks D and D1 in the clutch locks the disk carrier M with the spider N, which carries the other set of disks D1. In this way both shafts XR and XL are locked to rotate in unison with the shaft S and they carry the spider K around with them. To get reverse and low speed ahead two other three-disk clutches, R and L, are required, and the operation of which is simple.

For reverse, the clutches R lock the three shafts XR, only one of which appears, as these shafts are spaced at 120 degrees from one another around the mainshaft S. The three pinions P1 then rotate on their shafts XR, transmitting to the spider K which is thus driven in an opposite direction to the shaft S. For low speed ahead the clutch L is used, which locks the spider N so that it is stationary in the case G. This spider carries a low gear pinion LP in mesh with the three pinions P2, which set up a planetary movement around it.

When the driver desires to engage the high speed clutch, movement of the lever results in the closing of the vise on the disks, as follows: Through the compound action of a screw, which is thrown into engagement by the lever system, the original effort of the operator is added to by the torque of the screw, transposing the torque of the motor. All the operator has to do is to make the initial effort, and the pressure resulting is enough to bring the screw into action, when the torque of the motor will serve to engage the clutch by a winding up process, all without the use of a heavy spring and at the expense of a minimum effort on the part of the operator, while, at the same time, the engagement is not only gradual but positive.

This planetary belongs to the internal gear type, is therefore free from noise when well made, and as the system is made, the low speed pinion on the shaft, when going into reverse, transmits its motion through overlapping intermediates, of which there are two pair, thus making the mechanical balance perfect, and assuring adequacy of mechanical ability without having to resort to the use of large members and the resultant noise, inertia effects, etc. The low speed gear, which is attached to the spider, is free to engage either the high or low speed clutch at will.

QUESTIONS ABOUT GEARS

Benson, Minn.—Editor Motor Age—1—What should be the diameter of the large differential wheel shaft gear to give a ratio of 3½ to 1 and the number of teeth on same?

2—What is the diameter and number of teeth on an engine drive shaft pinion for a ratio of 3½ to 1?

3—Give the formula for figuring the pitch and depth of the teeth on bevel and straight type gears.

4—Which are the better for all differential bearings—bronze, nickel babbit, roller or ball bearings?

5—What material should be used for patterns for gears and what grade and kind of steel are used for their manufacture for best results?

6—Can gears of styles such as bevel, spiral and straight be successfully cut on a planer? If so, is there any special vise or clamp used?

7—Would spiral or straight gears be recommended for a differential? Which are the more expensive to cut?

8—Are there any instruments for determining the proper pitch and depth of gear teeth? If so, where can it be had, as well as a book treating on same?

9—Give the diameter of transmission, high, intermediate, low and reverse gears; also number of teeth on each for 3½ to

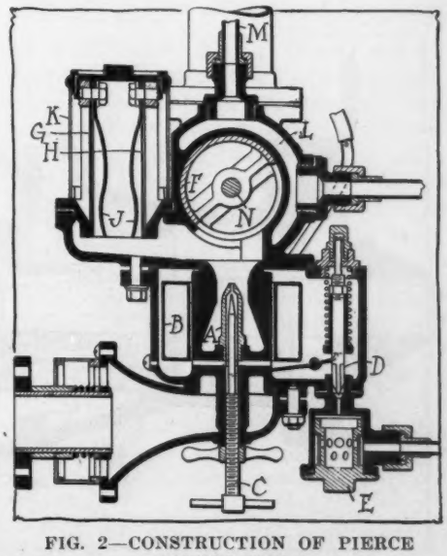


FIG. 2—CONSTRUCTION OF PIERCE CARBURETER

gears; these gears do not revolve very often and act more as a clutch than as a gear, so that the teeth do not have to be formed very accurately. When this style of shaper is used the tool which forms the teeth is made to a templet and the teeth are not generated as when any of the three other makes of machines are employed. The Gleason and Hugo Bilgrim planers, or generators, are the machines most used for generating bevel gear teeth and the Fellows shaper is the one used for generating spur or straight gear teeth.

7—The spur gears for the differential seem to be preferable as they are much cheaper to manufacture and do not throw such a thrust on the bearings as is the case with the spiral gear. The spiral gears have been used for experimental work in a few instances, but have never been adopted universally.

8—The Brown & Sharpe Co., of Providence, R. I., has designed an instrument called a gear vernier tooth gauge and this instrument can be purchased from that concern as well as a book treating on the subject of their use.

9—There is no fixed rule or universal practice in the design of transmission mechanisms as the different manufacturers of gearsets have made the size of their gears to correspond with their own ideas as to what power their gears will transmit. The high speed usually is transmitted direct to the clutch on the spur shaft which couples direct to the engine shaft, so that a 1 to 1 ratio is obtained; that is, the propellor shaft revolves at the same speed as the engine. The intermediate speed usually is about 1.9 to 1, and the gears are anywhere from 2¾ to 3½ inches in diameter and either 6 or 6-8 pitch, which gives a little stronger tooth. The low speed is from about 4½ to 4¾ to 1 ratio, and the gears measure from about 3½ on the large gear to 1⅞ inches to 2 inches on the small one; these diameters, of course, being the pitch diameters. The face of these gears with a 20-horsepower car usually is ⅝ to ¾ of an inch. The material used on such gears generally is alloy steel so the gears can be made as small in diameter as possible and permit the case to be both small and light.

CRANKS AT NINETY DEGREES

Kenton, O.—Editor Motor Age—Will Motor Age tell me why four-cycle crankshafts are set on halves? Can they be set on quarters, as in the two-cycle, and about what would be the additional cost of construction and the disadvantages of setting a four-cycle crankshaft on quarters?—F. J. S.

The reason crankshafts are set on halves, or 180 degrees apart, in four-cycle engines is to make the power impulses come at regular intervals. The very fact that the four-cylinder, two-cycle crankshaft has cranks at 90 degrees shows the reason that a four-cycle engine of the same number of cylinders cannot be set the same way. Since the piston of a four-cycle engine must make two trips back and forth in the cylinder between explosions, and in the two-cycle engine only one, the cranks in the former must be set twice as far apart, as in the latter. But if we use as many cylinders of the four-cycle type, that is, eight cylinders, the cranks could be set on quarters. Motors with less than eight cylinders and cranks at 90 degrees would result in irregular firing.

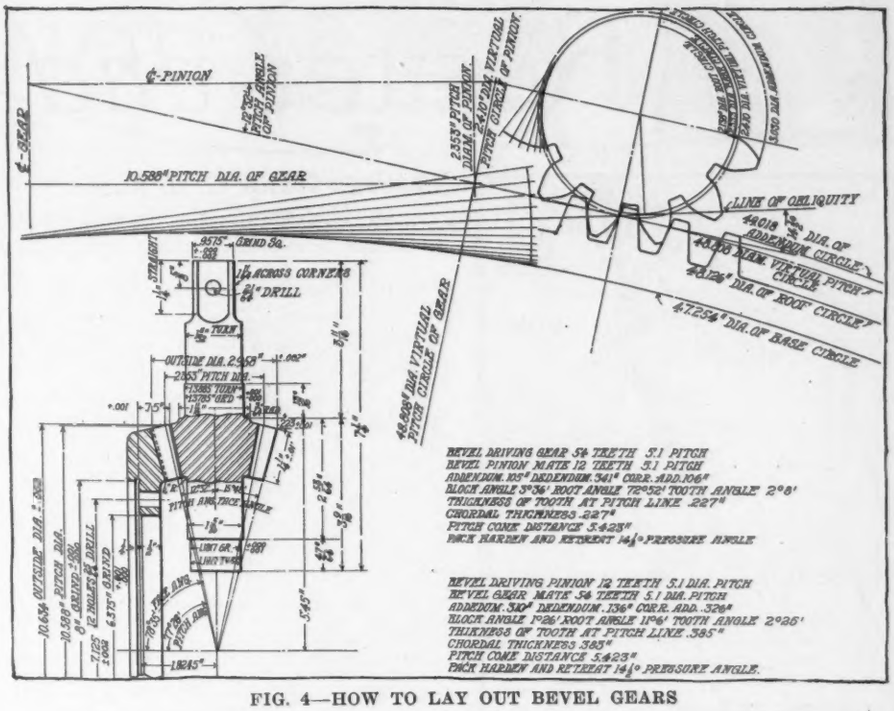

℄-PINION
℄-GEAR
10.588" PITCH DIA. OF GEAR
2.353" PITCH DIAM. OF PINION
PITCH CIRCLE OF PINION
LINE OF OBLIQUITY
14.018" DIA. OF ADDENDUM CIRCLE
13.126" DIA. OF ROOT CIRCLE
4.7254" DIA. OF BASE CIRCLE
10.654" OUTSIDE DIA. OF GEAR
10.588" PITCH DIA.
9" GRIND STOCK
2.125" DIA. OF PINION
6.5" GRIND STOCK
PITCH CONE ANGLE
PITCH ANGLE
1.845"
BEVEL DRIVING GEAR 54 TEETH 5.1 PITCH
BEVEL PINION MATE 12 TEETH 5.1 PITCH
ADDENDUM .810" DEDENDUM .541" CORR. ADD. .106"
BLOCK ANGLE 3°36' ROOT ANGLE 72°52' TOOTH ANGLE 2°8'
THICKNESS OF TOOTH AT PITCH LINE .227"
CHORDAL THICKNESS .227"
PITCH CONE DISTANCE 5.423"
PACK HARDEN AND RETREAT 14½° PRESSURE ANGLE
BEVEL DRIVING PINION 12 TEETH 5.1 DIA. PITCH
BEVEL GEAR MATE 54 TEETH 5.1 DIA. PITCH
ADDEDUM .540" DEDENDUM .136" CORR. ADD. .326"
BLOCK ANGLE 1°26' ROOT ANGLE 11°6' TOOTH ANGLE 2°26'
THICKNESS OF TOOTH AT PITCH LINE .585"
CHORDAL THICKNESS .585"
PITCH CONE DISTANCE 5.423"
PACK HARDEN AND RETREAT 14½° PRESSURE ANGLE.

FIG. 4—HOW TO LAY OUT BEVEL GEARS

OILING ON MODEL T FORD

Pratt, Kan.—Editor Motor Age—Answering E. C. Ehret's communication in Motor Age, issue May 4, page 23, regarding excessive lubrication in his model T Ford: I have put in much time correcting this matter. I find that by lowering the overflow hole in what is called the baffle plate ½-inch and sawing the dips off of the connecting rod boxings this can be remedied. Saw the dips close, as there are no dips on the new boxings and the new Fords have no baffle plate. I know this will correct the trouble because I have demonstrated it time and again. The new Ford models have a crease around the center of the piston to stop the flow of oil upward. The new cars use about one-half as much oil as the early T models used. I do not like the suggestion of crimping the pipe, as no living man can tell how much to crimp the pipe. Besides, it is not mechanical. Mr. Ehret is taking no chances in following my suggestions, as I have had ample experience in this matter and know it is right or I would not so advise him.—J. W. Farmer.

PRIMING WINTON SIX

Bloomer, Wis.—Editor Motor Age—I have a 1909 Winton Six which bothers me about starting. Can Motor Age give me any suggestions? The car is equipped with a Stromberg carbureter, and the trouble seems to be in getting the cylinders primed. Would there be any objections to putting priming cups in the inlet valve covers? What mileage should a Winton Six give per gallon of gasoline under ordinary conditions?—Subscriber.

There would be no objection to putting priming cups in the inlet valve covers, but a better way would be to procure relief cocks with priming cups attached. This would be much simpler and probably more satisfactory.

Approximately 9 miles should be covered by a Winton six on 1 gallon of gasoline under ordinary conditions.

HUMMING GEARS

Marion, Ind.—Editor Motor Age—Kindly tell me through the Readers' Clearing House how to get the hum out of the gears of my Regal car. I have put ground cork in them but this does not stop the hum.—Subscriber.

If the gears are badly worn the humming is probably due to the wear and the best remedy will be new gears. The humming can be greatly lessened, in any case, and sometimes stopped entirely by the use of flake graphite. This should be mixed with the lubricant in the proportions of about one tablespoonful of graphite to the pint of lubricant.

SUGGESTS GLASS TOPS FOR COUPES

Oklahoma City, Okla.—Editor Motor Age—If the makers of coupe bodies would make the tops of the coupe of glass for fall, winter and spring use, it would in my opinion be a great benefit and comfort to invalids and very agreeable to the well. A curtain cover could be arranged as a protection from excessive heat.—A Reader.

It is very doubtful that there would be sufficient demand for glass tops in coupes to warrant their manufacture.

1 ratio. Motor is 20 horsepower, cylinders 3¾ by 4¼ stroke, and weight of car 1,600 pounds.—E. A. Wright.

1—The diameter of this gear would, of course, be governed by the power which is to be transmitted through the gear and the velocity of it also would be limited somewhat by the size of the housing which encloses it. The gear housing, of course, would be designed according to the power and weight of the car and would in all probability be of correct size to take a gear of sufficiently large diameter. The only other feature, then, which would affect the size of the gear would be the number of teeth in the pinion; and this really is the starting point for laying out gears, as it is not desirable to have a pinion of fewer than twelve teeth and for 3½ to 1 ratio there should be more than twelve teeth if possible, as it is quite often desirable to go to a 4 to 1 ratio, and on the 4 to 1 it would become necessary to use a fourteen-tooth pinion. One of the Brown-Lipe-Chapin Co.'s standard combinations of 3½ to 1 ratio is a forty-nine-tooth four-pitch gear ring, and a fourteen-tooth four-pitch pinion. The pitch diameter of the large gear is 12¼ inches, and the pitch diameter of the pinion is 3½ inches.

2—This question has practically been answered by the above paragraph, and the only other feature which would enter into its design would be the size of the engine shaft necessary to transmit the power of the motor. The combination cited above for a 60 to 75-horsepower car has a 1½-inch bore in the pinion with a taper of 2 inches to the foot. This, of course, is a specific case and would not be applicable to all designs. Of course, if a higher-powered car were to be used where the shaft had to be considerably larger it might be necessary to make the pinion larger to take a bore of sufficient size, and this would increase the size of the pinion. This, however, should give a fairly good idea of what is practiced in the average motor car construction.

3—As for a formula for figuring the pitch and depth of the teeth on the bevel and straight-type gears the pitch usually is given, and in most instances the diametrical pitch, which means the number of teeth to every inch of pitch diameter; for example, forty-teeth four-pitch would be a pitch diameter of 10 inches, there being four teeth to every inch of pitch diameter and forty teeth in the gear. If it is desired to figure the corresponding circular pitch, it would be necessary to divide by the diametrical pitch. An example might be taken from the gears just cited above; if we divide 3.1416 by four it would give us a circular pitch of .7854. This is the standard formula for figuring gears. In regard to the depth of a standard gear, the addendum and dedendum of the gear is equal to 1 divided by the diametrical pitch, and in the four-pitch gear it would be .25.

The clearance of a gear of standard design is equal to .10, the thickness of the tooth which for the four-pitch would give .03927, making the full depth of the tooth .53927. The above portions are for the regular standard 14½-degree or 20-degree involute tooth. Of course, there are various formulae and constructions of teeth which vary a good deal from this practice, many manufacturers have special constructions which in their opinion give a better running gear than this form. The most important features in designing gear teeth are to eliminate undercut as much as possible on both gear and pinion and to design the teeth to cut as long an arc of action as possible and maintain a good, strong and substantial form, but the standard practice is the only one practicable for the average jobber or manufacturing plant to cut unless they are equipped with the most up-to-date planers and gear-cutting machines. The drawing shown in Fig. 4 gives the profile of a set of gears laid out to give the longest action possible and is quite different from the old standard method as adopted by the Brown & Sharpe company when that concern first made its involute cutters.

4—All of the bearings mentioned are good and it simply is a matter of choice for the axle or motor car manufacturer to decide for himself. Most concerns, however, have abandoned the plain bearings and are using either the roller or ball construction because of their easier replacement and adjustment, and perhaps because of their greater efficiency in proportion the space which they require. Any bearing, though, that will hold the gear in correct alignment is good.

5—Most gears used in motor cars are made from forgings. The only style of gears perhaps which at the present time are made from castings are large gears for heavy machinery and mining work. The average gear either is generated on a planer or hobbing machine or formed with an involute rotary cutter. The best kind of steel to use for cut gears varies, of course, with the use to which the gears are to be put. A popular kind of steel now used is .20 carbon for the large driving gear and 3½ per cent nickel or other alloy steel for the pinions.

6—It is not quite plain as to whether you mean a gear-planer or the ordinary planer used for straight planing and tool work. Motor Age has never heard of the latter type of planer being used practically for forming gear teeth and does not believe that this style of machinery is suited for the work. If you refer to a gear-planer, such as the Gleason, Fellows, or Bilgrim, these planers have given very good results for cutting both straight and bevel but have not as yet been perfected for cutting the spiral gears, although James Gleason of the Gleason works, Rochester, N. Y., is now designing one of their generators to cut bevel gears on the helix, and it is expected that this project will develop successfully. As far as using any special vise or clamp on a planer, more familiarity with the design would be required before an assertion could be made on this point. Of course odd jobs in gears which do not have to run at very high speed, or run at intermittent times, have been cut successfully on the small quick-return shapers, and at the present time this kind of a machine is used for cutting a special kind of internal differential

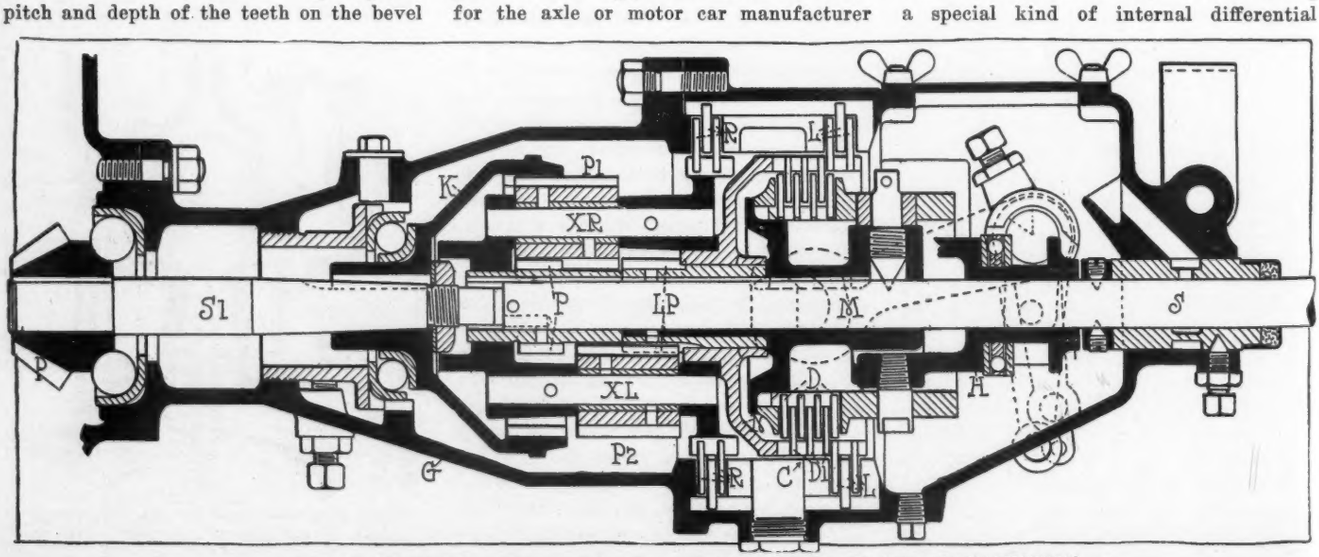
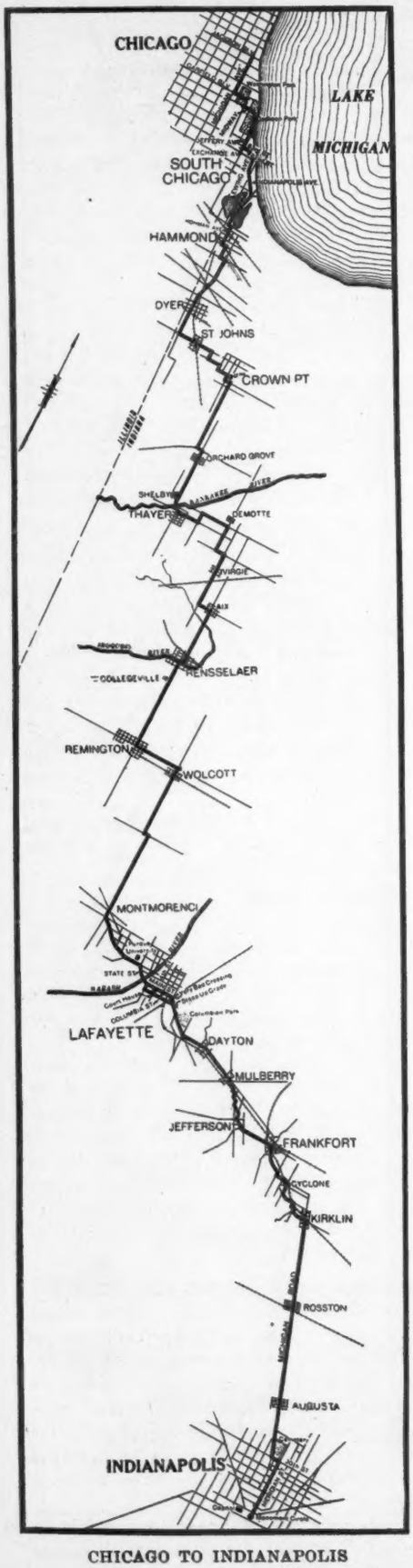


FIG. 3—SECTIONAL VIEW OF BRUSH GEARSET SHOWING ITS CONSTRUCTION

Routes and Touring



CHICAGO TO INDIANAPOLIS

Chicago Motor Club Route to Indianapolis Speedway

CHICAGO—Editor Motor Age—Many motorists in Chicago and the vicinity contemplate making the run to Indianapolis for the Memorial day races at the speedway. For the benefit of their members who intend making the trip, the Chicago Motor Club has distributed a booklet giving a detailed map and route directions. This route and the accompanying map were prepared for the Chicago Motor Club by the Automobile Blue Book Publishing Co., Chicago. The figures in the margin and in parenthesis refer to the total mileage from Chicago.

0.0 Chicago, Michigan avenue and Jackson boulevard. Go south on Michigan avenue to Garfield boulevard (5.8) then through Washington park to the Midway and into Jackson park, Sixtieth street (8.1). Exit from park (8.9) onto Jeffrey avenue at Sixty-seventh street (9.1). Straight ahead on Jeffrey avenue to South Chicago avenue and Eighty-third street (11.1); turn sharp left 1 mile; turn right into Baltimore avenue to Exchange avenue, straight ahead to Ninety-second street.

13.3 South Chicago. Go left on Ninety-second street across bridge, then on Ewing avenue to 1 block beyond railroad viaduct; then bear left at fork on Indianapolis avenue to four-corners at Wolf lake clubhouse (17.2); turn right on macadam, same thoroughfare becoming Sheffield avenue.

22.1 Hammond. Turn square left on Fayette street to end of street (22.8); turn right on macadam; turn left (24.0) to four-corners, brick saloon on left (24.5); turn right to end of road (26.8); jog right and left, bear right (29.8) to end of road (31.3); turn right and next left through

31.7 Dyer, curving right (32.2) to four-corners (34.7) dirt straight ahead; turn left on macadam through

37.4 St. Johns; right-hand road (39.6); turn right to end of road (40.6); turn left to end of road (42.4) red house on right; turn right to right-hand road (43.0); turn right to end of road (43.5); turn left to

44.8 Crown Point; follow Joliet street out of town; four-corners at edge of town (45.5); turn right on macadam down eastern side of 1909 Cobe cup course; south to end of road (54.1); turn left for ½ mile.

54.6 Orchard Grove, four-corners; turn right to end of road (61.8); turn left and right to four-corners at

62.8 Thayer; turn square left on stone road to four-corners (65.7) sand road straight ahead; turn left to end of road (66.7); turn right to four-corners (70.6); turn square right following macadam road to cross road (73.5); turn left to next four-corners (74.5); turn right to

76.3 Virgie, running straight south to left-hand road (81.5) small house on left; turn left to four-corners,

83.0 Aix. Turn right, follow road south to prominent right-hand street, Main street (90.2); turn right to center of

90.4 Rensselaer. Continue on Main street; follow road south for over 11 miles to four-corners in edge of

102.3 Remington. Turn square left to four-corners (108.1); turn right to

108.6 Wolcott. Straight south through town for over 8 miles; curve left with road to right-hand road (117.5); turn right, for over 11 miles to

128.6 Montmorenci. Go short distance beyond tracks, turn left; turn right; turn left (128.8); curve left (134.5) pass Purdue university to fork (136.4); bear right on Main street to court house

137.2 Lafayette. Columbia street on farther side of court house; turn left to four-corners at top of grade (138.1); turn right to prominent left-hand road (5.4); turn left, straight through

144.9 Dayton to prominent fork (145.3); turn left to

150.8 Mulberry, five-corners; turn right on middle street and to right-hand road (156.8); turn right and left through

157.2 Jefferson. Follow road onto Clinton street to court house, center of

161.4 Frankfort. At farther side of court house turn right on Jackson street to Alhambra street; bear left to end of road (165.0) brick school on right; turn right to left-hand road (165.7); turn left to fork, brick school on left; bear right to prominent four-corners at

167.8 Cyclone. Turn right to four-corners; turn left; turn right (169.3) and left a short distance beyond. End of road (177.1); jog right and next left to

173.3 Kirklin, four corners. Turn square right on Michigan road; straight ahead through

183.7 Rosston and

185.1 Augusta. Straight ahead 16 miles; turn left (201.1) on Thirtieth street to Meridian street; turn right across stone bridge (202.4); straight ahead, passing postoffice on left (204.7) to soldiers' monument,

204.8 Indianapolis.

SPEEDWAY: At 200 miles, top of 5-mile hill, a road leads right (west) to speedway.

Speedway road from center of Indianapolis is marked with numerous signboards.—J. P. Dods.

In this department Motor Age will give information on routes and touring conditions. Suggestions on new or better routes are invited. All communications must be properly signed, as an evidence of good faith, but should the writer not wish his name to appear, he may use any nom de plume desired.

FORT DODGE-DENVER ROUTE

Eagle Grove, Ia.—Editor Motor Age—Will Motor Age give me the Glidden tour route for the trip from Fort Dodge, Ia., to Denver, Col.?—John A. Wright.

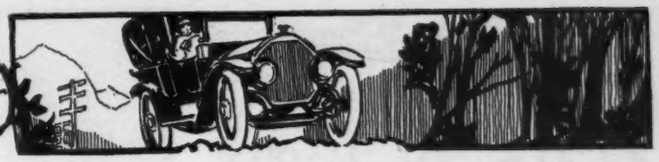
A distance of approximately 185 miles from Fort Dodge, Ia., to Omaha, the route as covered by the Glidden tourists in the summer of 1909 passed through Moorland, Callender, Gowrie, Dana, Grand Junction, Jefferson, Scranton, Ralston, Glidden, Garroll, West Side, Vail, Denison, Arion, Dow City, Dunlap, Woodbine, Logan, Missouri Valley, Loveland, Honey Creek, Crescent, Council Bluffs, Omaha. For the Omaha-Denver portion of the route you are referred to the communication and map which appeared in Motor Age, issue March 23, page 22.

MINNEAPOLIS TO NORTH DAKOTA

Bemidji, Minn.—Editor Motor Age—Please advise me through the Routes and Touring Information department of the best and shortest route for a tour from Minneapolis, Minn., to Grand Forks, N. D., via Bemidji and Crookston.—W. Lycan.

Incorporated in an answer to a communication from A. G. Whitney at St. Cloud, Minn., in this department of Motor Age for April 6 you will find the itinerary from Minneapolis to St. Cloud. From St. Cloud to Sauk Center is 10 miles through St. Joseph, Cold Springs, Torah, St. Martins, New Munich, and Melrose. Now traveling north pass through Long Prairie, Eagle Bend, Wadena, Park Rapids, Walker

Information



and Bemidji. Continue to Grand Forks, N. D., by way of Fosston, Mentor, Benson and Crookston.

From Sauk Center to Long Prairie is a fair sandy road with some clay; to Eagle Bend and Wadena the roads are rather poor and you will encounter some clay and deep sand in places; the road is fairly good from Wadena to Bemidji. From Bemidji west it is rather rough and sandy with considerable clay which makes it strenuous going in wet weather, but nevertheless is the only road to take from Crookston to Grand Forks, N. D., where the roads are in excellent condition.

MEMORIAL HIGHWAY

Montreal, Ont.—Editor Motor Age—George A. Simard, chairman of the Canadian committee in connection with the proposed new highway between Montreal and Rouse Point, believes that the best memorial to the late King Edward would be a boulevard from Montreal to Rouse Point, N. Y., to connect with the fine road that New York state is building from New York city to that point on the border. This would not only be a lasting memorial to the late king, but it would also serve to commemorate and in a way typify the hundred years of peace which has existed between the two countries. It has been pointed out that nothing would make the name of King Edward more familiar to coming generations. The governor-general of Canada approves heartily of the plan.—A. L. MacDougall.

SHORT IOWA TRIP

Sheldon, Ia.—Editor Motor Age—I wish Motor Age would kindly give the best route from Sheldon to Grinnell, Ia., as I want to make the trip in a short time.—Subscriber.

A route from Sheldon to Cherokee would be by way of Sanborn, Primghar, Gaza, and Southerland. At Cherokee you strike the Hawkeye highway and follow through Aurella, Alta, Storm Lake, Newell, Fonda, Pomeroy, Manson, Fort Dodge, Webster City; thence to Standhope, Boone, Jordan, Ames, Huxley, Ankeny and Des Moines. Here you come to the river-to-river road and travel to Grinnell through Altoona, Mitchelville, Colfax, Newton, and Kellogg.

OREGON'S IDEAL TOUR

Portland, Ore.—Editor Motor Age—Surpassing the famous ideal tour among the White mountains of Vermont and New Hampshire for scenic splendor, equalling the Bad Lands in Montana in places for ruggedness, and penetrating the best trout fishing and camping section in the country, Oregon is perhaps an ideal tour route for motorists this summer. There are but few points of road building necessary to complete this picturesque and delightful route. Likened somewhat to the White mountain trip, the Oregon ideal tour will be around a loop, the trip covering perhaps 300 or 400 miles.

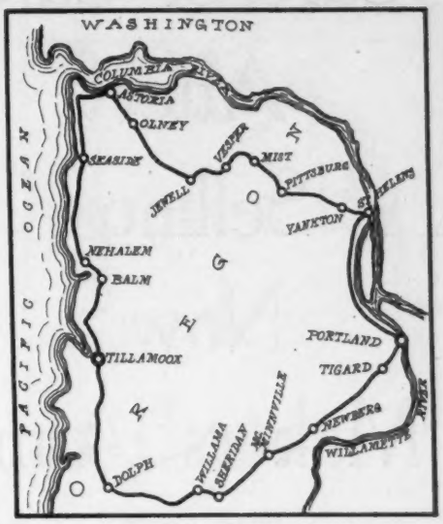
The route is from Portland to Tilamook, either across the coast range from Sheridan and Willamette valley, or across the mountains and into the romantic Nehalem valley by way of St. Helens and Mist, skirting the Pacific ocean for many miles. Probably the more favorable way to go in making the tour around the loop will be by way of Willamette valley and Sheridan and thence up the coast from Tilamook, into Seaside, Gearhart and Astoria.

Either way the motorist goes he will find scenes rivaling the Grand canyon of the Colorado, and, in addition, will have the tang of the salt air as he rides along the beach. The ideal tour in Vermont and the other staid, old new England states has its advantages, but they are solely the advantages of good roads and hotel accommodations.

Oregon's ideal tour, for the time being, will not boast of any great amount of good roads. However, they will be passable this summer. Hotel accommodations too are not of the best, but the camping sites are not to be equalled on the face of the globe. With the completion of a boulevard over the chosen course, will follow the upbuilding of summer resorts for the accommodation of motoring parties.

There are yet 5 miles of highway to be constructed before the ideal tour will be open for public travel. These miles lie on a level country, easily accessible to Astoria and Clatsop counties. The stretch of road necessary is from the northern base of Neah-kah-nie mountain to the Clatsop county line. The unimproved road is in Tillamook county and, it is understood, will be immediately improved. Two years ago the difficult engineering feat of building a road over the Neah-kah-nie mountain was successfully accomplished, and just why the adjoining 5 miles of road was not built is a question.

However, with Portland influences working at each end, it is safe to surmise that the road will be made ready for motor traffic by early summer. And by that time the Portland-to-the-sea-road through Multnomah, Columbia and Clatsop counties will be in first class shape. Columbia county is expending many thousands of dollars improving the road with its 3 per cent grade over the coast range. Where the Columbia county ceased work the Clatsop county employes took it up. With these roads completed and with the 5 miles of road making in the northern part of Tilamook county done, the motorist will have easy riding all the way round the



OREGON'S IDEAL TOUR

tour, for the road between Neah-kah-nie mountain and Sheridan through Tilamook city, is a good one and one much traveled during summer months by Oregon motorists.—F. K. H.

REGARDING REGISTRATION

Walker, Ia.—Editor Motor Age—I am desirous of making a trip through Iowa, Illinois, Indiana, Ohio, New York and Pennsylvania by motor car. My car is registered in Iowa and carries the number on the rear of the car. What other steps will be necessary for me to make in regard to registration, license, driver's license, etc.—A. G. Gary.

As long as you have complied with the motor car laws of Iowa, you will be allowed to tour in Illinois, Indiana, Ohio and New York without registering in any one of these states.

INTERNATIONAL MEMORIAL BOULEVARD

Care of Cars After Selling Now Makers' Aim

This, the Peerless branch at Boston, is an excellent example of the modern motor car service building, so many of which have and are now being erected by the most prominent motor car manufacturers in the larger cities throughout the country. More completely equipped are many of these service buildings than some of the so-called motor car factories

SITUATED on Boston's finest boulevard and on the edge of the most aristocratic residence section of the city is the new Peerless branch and service building; and in keeping with the architecture of the neighboring town houses of Boston's elite, it without a doubt is one of the finest and most complete motor car sales and service buildings in the land.

There are 142 employes outside of the office force, which brings the number on the payroll up to 165, and the whole organization is one of which its management can well be proud. This branch is the distributing center for the whole of New England, and it is estimated that 250 cars will be sold through it this season.

Dimensions of Building

The building has a 90-foot front and is 115 feet deep. It has six floors above ground and a basement, and an approximate floor space of 70,000 square feet. The salesroom located on the ground floor is 90 by 45 feet; it is finished in Terazzo and mosaic flooring and mahogany wainscoting; the furniture of the salesroom is made from mahogany of special design to harmonize with the general scheme of decora-

In a business department which is completely furnished, systematically arranged and free from confusion, most of the business of the territory covered by the branch can be promptly attended to, and much congestion at the factory relieved. The picture speaks for itself

The Service Building Operated By Peerless in Boston

Quiet refinement and splendor are characteristics of the sales departments of these branches. Here the prospective purchaser is received and the product of the company arranged in its various styles for his and her inspection. Here, also, is the present owner courteously received and prompt attention paid to his wants or troubles as the case may be

tion. The rear part of the building on the ground floor is used as a garage for demonstrating cars and general service and the dimensions of this department is 70 by 90 feet.

On the second floor are located the private offices, general offices, superintendent's office and stock and supply departments. The third floor is used for light overhauling. The tool room and machine shops are located on the fourth floor where all general overhauling is done. The trimming department, blacksmith shop and tin shop occupy the fifth floor, while the sixth floor comprises the painting department.

The elevator equipment consists of two large electric freight elevators, each with a platform measuring 22 by 10 feet; a small freight elevator in the rear of the building running from the basement to the sixth floor, passing through the stock room, and used for transferring all heavy parts to different floors of the building; and for convenience of salesmen and their customers, a small automatic electric elevator which runs from the salesroom to the sixth floor.

Each machine in the building, including

The garage or actual service department on the ground floor is devoted to the immediate wants of the motorist or chauffeur. A rendezvous for cars in the care of chauffeurs awaiting the call of the owner or mistress, and where adjustments and supplies are obtainable

It is convenient to have the small repair job department separate from the general overhauling department to avoid confusion. The department shown above is such a one, and is devoted solely to small operations requiring from a couple of hours to a day or two of time. This floor has an electro-plating room equipped for replating brass, nickel and copper

one at every turn, even the floor is marked with heavy white lines which indicate the positions in which the cars must be left; so that not only is the military array of cars or chassis in the course of overhauling or in storage a pleasing one to the eye but a very practical advantage is obtained in that a reasonable amount of space is left between the cars in which the workmen may work conveniently.

Among the Metal Workers

Turning from the trim shop and passing back to the blacksmith and tinsmith departments, where all metal work repairs are performed and fenders and gasoline tanks for special bodies manufactured, the same completeness of equipment and simple neatness of its arrangement exists. Windows are large and numerous, so that the light is excellent; forges have individual electric blowers; gas and compressed air are piped to the oven which heats the soldering irons, and in all these departments every facility is provided to inspire the workmen to do their best and enjoy doing it.

The blacksmith and tinsmith departments of the Peerless Boston branch occupy a portion of the body trimming department, and like other parts of the organization, are in charge of workmen skilled in their trades and who are provided with every facility for doing good work. Here the metal work for special bodies such as fenders, etc., is formed and fitted

On the fourth floor, the next one below, is the general overhaul shop, where all big repair jobs are done. At the rear is the machine tool department and motor overhauling room, screened off from the general chassis repair section. This section contains one 18-inch American lathe, two 16-inch American lathes, all driven by individual electric motors; one 16-inch American shaper, a 14-inch drill-press, a small upright drill press, a small speed lathe, a two-wheel grinder, a large and a small arbor press, special cast iron stands for motors in the course of repair, a galvanized iron wash basin of ingenious design with kerosene in it for cleaning mechanisms, a variety of specially constructed wash trays for cleaning gearsets, rear-axles and smaller parts, adjustable iron standards for supporting crankshafts while being worked upon, and many special tools, pneumatic drills and riveting machines.

Place for Everything

There is a place for everything and everything, not in use, is in its place; and the beauty of it all lies in the fact that the racks are so conveniently placed that it is easier to put the tools in their respective places than anywhere else. Every workman in the shop is required to have a full kit of tools, the articles of which are shown in a case outside of the main stockroom on the second floor of the building; and should a tool be lost or broken it must immediately be replaced by another, obtainable at a reasonable cost from the stock, so that borrowing of tools is discouraged, as it is a bad habit which wastes time and often causes much internal strife among fellow workmen.

Checking the Tools

Special tools are kept in the machine tool department, and a regular factory checking system employed to keep track of them. Each workman has a certain number of brass checks in exchange for which he may obtain special tools from the tool racks, and which checks are hung on a little nail or hook opposite the place

A general overhauling department with a fully equipped machine shop is essential to the complete service building. Here every removable part of the motor car mechanism is disassembled, cleaned, readjusted or replaced if necessary, and the various features properly re-assembled and put into first class condition for a strenuous season's work

three blacksmiths' forges, is operated by individual electric motors. The cost for installation of this system is large, but for machinery which has only intermittent use it is more economical than the overhead belt driven machinery.

The building is constructed of steel and cement, the posts being 30 feet apart, which permits the moving of cars easily in all parts of the building. The exterior of the building is of Indiana limestone and brick.

System of Establishment

System and simplicity prevail throughout the various departments of the building. On stepping off the automatic elevator at the sixth floor one enters into a large room covering the entire top story except for a section at the rear which is partitioned off to form dustproof drying rooms; for this floor is devoted entirely to the painting, varnishing and redecorating of motor cars. A specially constructed rack is provided in one corner of the rear portion for the storage of glass fronts, heelboards, mud aprons and the like, after they have been cleaned and painted or varnished, and while they are waiting to be re-assembled on their respective cars; and steel clothes lockers, sanitary wash basins, lavatories, etc., are provided for the workmen which are all that could be desired in the way of convenience, construction and arrangement.

Passing down the concrete steps at a rear corner of the building, to the next floor below, one comes into another large room occupying, this time, the entire floor; the front two-thirds without any definite line of demarkation, comprising the trim shop, and the rear third being divided between the blacksmiths and tinsmiths. In the trim shop practically all the tops and seat-covers for cars sold through this branch are made and fitted to the cars.

Making the Work Easy

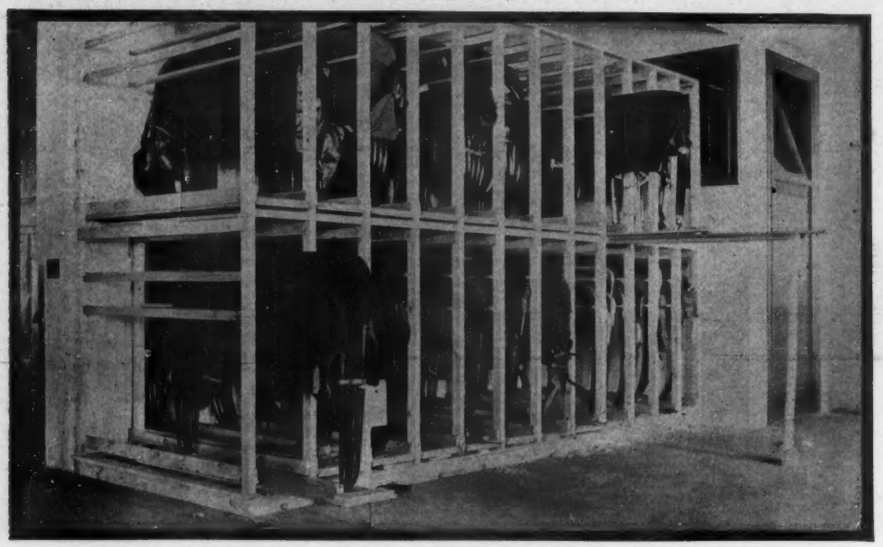
In this department as in all other departments there is to be found several unique and interesting features designed to facilitate the operations of the workmen and increase the general efficiency of the work done therein. In one corner of the trimming department, for instance, there is a double-decked rack for storing tops. It is an extremely simple looking wooden construction providing a cell for each individual top, with a baseboard mounted on rollers so that when a workman wishes to take a top out of the rack he has but to take hold of a handle on the baseboard, pull it out as one would the stenographer's slide of a desk, lift the top off and shove the board back into the rack. Smooth rails or guides are arranged along the sides of the cells; and the whole arrangement not only provides an excellent place of storage but enables the workman to remove or replace a top in the rack without assistance and without injury of any kind to the top.

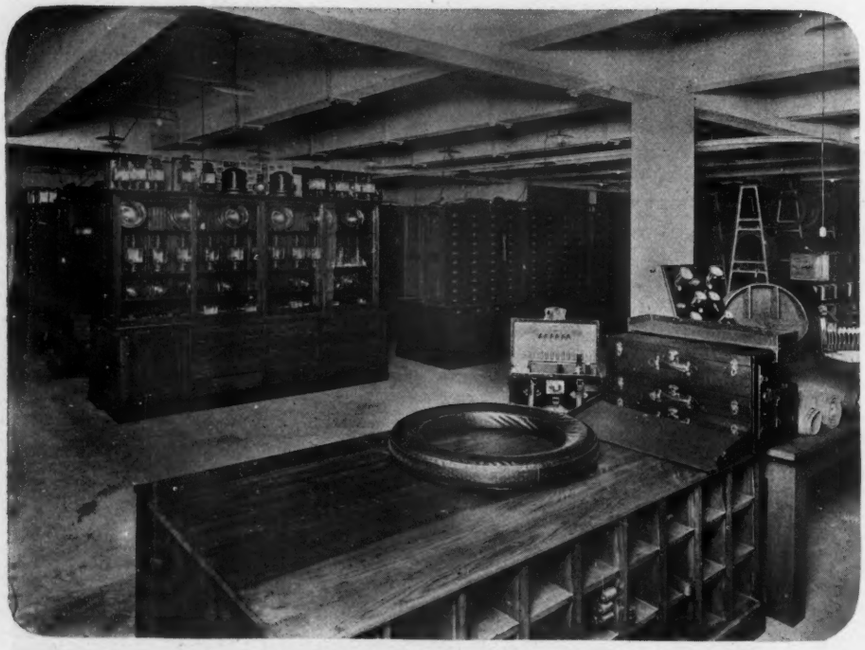
Another convenient feature is to be seen in the design of the long steps which are adapted to be placed on either side of the car to enable the workmen to easily reach any part of the top when raised.

To carry out the harmony that impresses

A complete equipment of machine tools, operated for the most part by individual electric motors for the sake of economy, is quite essential to the large service building where quick, complete and lasting repairs must be made. Such is the equipment of the Peerless branch, Boston, which is arranged in the orderly fashion shown in the above illustration

where the tool belongs, so that the tool-room keeper may at a glance at the rack know what tools are missing, and from the number of the check opposite its place readily ascertain which of the workmen is responsible for the tool. When the tool is returned the workman's check is returned.





A special double-decked rack is provided for the storage of motor car tops during the time that the body is being upholstered, painted, etc. The stock of extra parts and motor car equipment is most complete and systematically arranged. The painting department shown in the bottom view is quite worthy of the name Peerless. Its facilities are excellent

All electric wires throughout the machine shop and to the machines are inclosed in metal conduits and switches are of special design and conveniently arranged. Work benches throughout the building are supported on cast iron brackets, on which rest 3-inch maple planks provided with deep wide drawers with trays; every workman has a vise, and compressed air piped to his section of the bench; and there is an emergency medicine case with bandages and antiseptic dressings for use in case of accidents.

Some Conveniences

In this department the valves not only are ground in, but are placed in a lathe, reseated and reground. By way of special equipment in the chassis-overhauling section, a portable crane with a windlass attached is used; by means of this crane one man may easily remove a motor from a chassis, and it is found extremely useful in removing gearsets, rear-axles, bodies, etc. For lifting motors from chassis no rope is employed, but specially adapted iron slings are used, which not only facilitate operations, but prevent damage to the less substantial motor parts, possible when rope is improperly applied, and eliminates the danger of having the rope break or loosen up and drop the motor. Chassis are supported on cast iron standards when undergoing an overhauling, and three cast iron testing stands are provided in one corner of the room for testing each motor overhauled before it is assembled into the chassis. The motors are tested under their own power and excellent provisions are made for water, gasoline and ignition connections and control, and for conducting the exhaust gases into the open air over the roof of the building.

On the Third Floor

The third floor is used as a short repair-job department. Here jobs requiring but a few hours' or a few days' work are executed. This floor has an electro-plating room equipped for replating brass, nickel and copper, and for buffing and polishing plated articles. The equipment consists of four electro-plating baths, one each for copper, nickel, brass and black nickel; and a potash dip, an acid dip, a rinsing trough, several solution cleansing jars, two electrically driven buffing wheels and a work bench. The general shop equipment outside of the plating room comprises an emery-wheel grinder, a speed lathe, a drill press and a valve-grinding machine.

The stockroom, general offices and chauffeur's waiting room are on the second floor and more neatly furnished apartments or practicable arrangement would be hard to find. The stock is as spick and span as a burgomaster's kitchen. Practically all spare parts are kept in the drawers of a series of long cabinets. The drawers are of various sizes in some sections of the

cabinet to form suitable receptacles for the different sized articles, and most of the drawers are numbered, with the numbers arranged in numerical order and corresponding to the parts list number of the parts they contain.

The cabinets are arranged according to the model of the car whose parts they contain, and the system is so simple that a new stockman or anyone of ordinary intelligence would have no trouble in finding any part of a car when given the model of the car and parts-list number of the part desired. There is a large table in the stock room on which all incoming goods are placed and from which they are checked and placed in stock; a very simple but substantial cast and pressed angle iron rack is provided for the storage of tires, tire-baggage cases, and battery and tool boxes; and there are specially constructed tills and cabinets for keeping raw rod and sheet-metal materials and top and seat-covering cloths and fabrics, and there are tills for batteries, racks for oils and greases in cans.

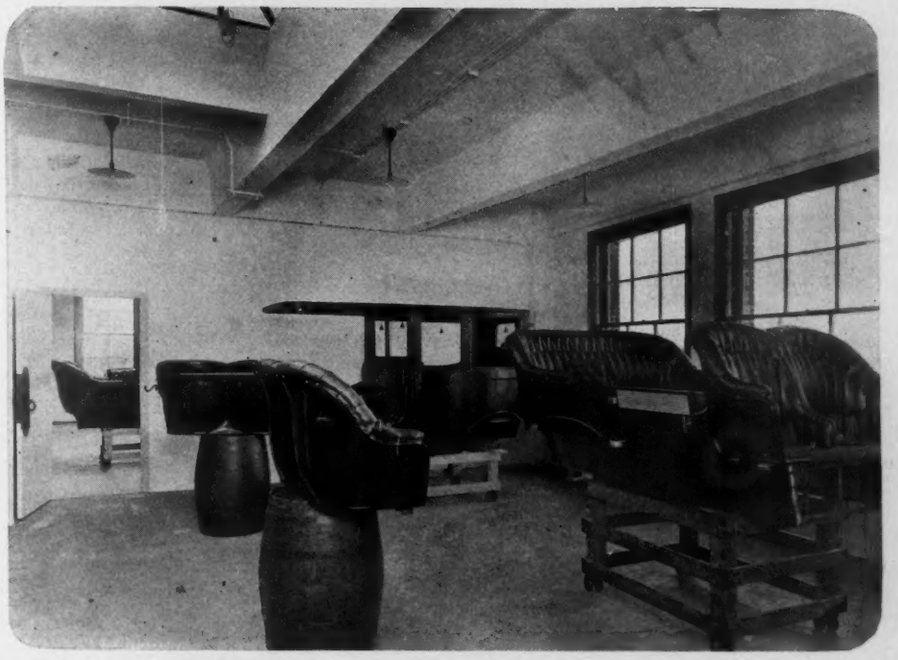
The Stockroom

A large high counter and a heavy wire partition separates the stockroom from a public lobby, off of which opens a show room, chauffeur's room and superintendent's office, and over this counter all business with the drivers and owners of cars is transacted, no outsiders other than those employed in the stockroom being allowed therein under ordinary circumstances. One section of the stockroom is fenced off to form a show room where extra motor car equipment such as rear-end trunks, side tire trunks, trunkracks, windshields, speedometers, lap robes, etc., are arranged on racks and tables so that Peerless owners or drivers may choose their sundry equipment, and have it properly attached to their cars in the third-floor shop.

In the garage, a record of every car that comes in and goes out of the place is rigidly maintained; Bowser oil and gasoline storage and supply outfits are employed to handle the fuel and lubricant for cars using the service, and a very simple repair card system is employed in connection with a Fisher tag-writing machine for cars requiring repairs or adjustments of any nature.

Some Other Features

Every car that comes into the building for a complete overhauling, after having a statement of the repairs made and inscribed upon the repair card system above mentioned, is sent to the basement where the sundry equipment is stripped from the car checked, and then placed in lockers; after which the car goes to the general overhauling department. In addition to the lockers, the basement provides storage room for extra bodies and cars awaiting delivery, and contains a boiler room, a smoking room for the workmen during the noon hour and a receiving department. In one corner of the boiler room is the Curtis automatic compressed air system in which a pressure of 80 to 100 pounds of air is maintained; and a Lamson pneumatic cash service system is employed between office and receiving department.



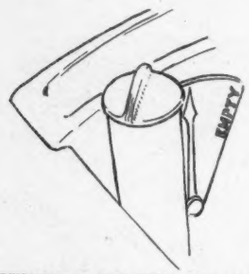
Three substantial cast iron motor testing stands occupy a corner of the Peerless general repair department. The varnishing and drying rooms of the painting department occupy a section of the top floor and have light in abundance. The trimshop or upholstering department partly shown in the bottom view requires two-thirds of the fifth floor of the building and is on a par with similar departments in some of our motor car factories

Clever Ideas Found on the New Car

Moline Oil Level Indicator
Columbia Baggage-Carrying Idea
Midland Oil Level Indicator
Maxwell Oil Well Cover
McIntyre Auxiliary Side Light
Stearns Grease Cup Idea
Stearns Oiling Device

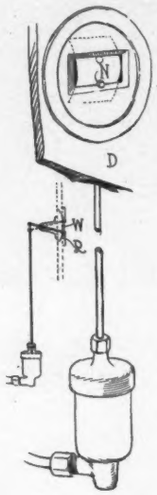
REFINEMENTS in 1911 motor cars have been numerous, and the last of the many illustrations gathered at the motor car shows of the year are shown herewith.

The Midland car has an indicator on the dash which is positive in its action, does not protrude from the surface thereof,



CONVENIENTLY LOCATED OIL LEVEL INDICATOR ON MOLINE MOTOR

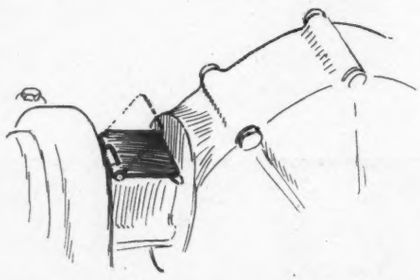
and eliminates the oil leads generally communicating between the dash and motor when oil sights or gauge glasses are employed for the purpose. The device shown in center column comprises a round plate on the dash D having a rectangular opening in its center, and this opening exposes the curved face W of a sector R that is attached to the end of a lever. The lever is fulcrumed at or near its center and to the opposite end a rod is pivoted, which extends vertically downward into a cylinder. There is a plunger on the end of the rod which extends down into the cylinder, and the cylinder is connected into the oil supply system. As long as the proper amount of oil is being maintained in the crankcase the plunger remains at the top of the cylinder, and as it diminishes the plunger descends and raises the lower portion of the sector on the dash into view. This lower portion below the nob N is painted red, and the upper portion white, the red denoting danger and the white



AUTOMATIC DASH OIL LEVEL INDICATOR OF MIDLAND CARS

that the system and supply is in good order.

The Moline has a regular clock hand and dial opposite the filler pipe on the right rear end of the motor crankcase, for the purpose of indicating the amount of oil in the reservoir. This is an excellent position for the indicator, as the hand can be readily observed at all times and especially when the supply is being replenished.



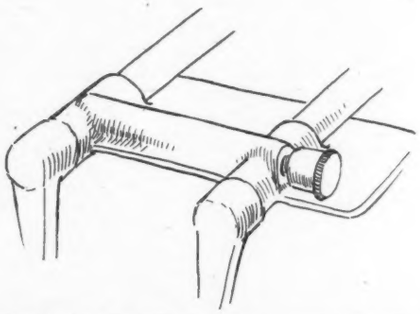
HINGED COVER OVER LARGE OIL FILLER OPENING BEARINGS AND GEARS OF MAXWELL REAR AXLE

For the lubrication of running gear features, the Maxwell has a large opening over the pinion bearing of the rear axle and propeller shaft, with a hinged cover that can be raised easily for the purpose of replenishing the oil supply of pinion, driving and differential gears and bearings.

The Stearns brake-rod bearings are both included in a single bracket, and the connection between the two bearing portions of the bracket is cored out to form a grease duct. In this way a single grease

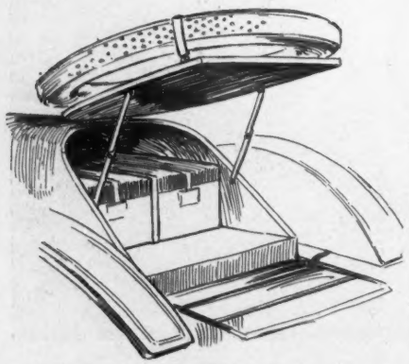
AUXILIARY QUICK DETACHABLE SIDE LIGHT FITTED ON A McINTYRE CAR

cup serves for the lubrication of both bearings, and both are lubricated simultaneously. The lubrication of the front end bearings of the Stearns propeller shaft and torsion tube also are well provided

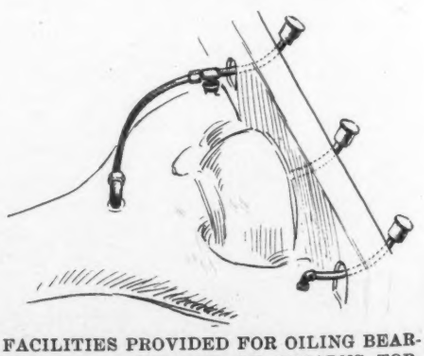


ONE GREASE CUP SIMULTANEOUSLY OILS BRAKE ROD BEARINGS ON STEARNS CARS

with lubricating facilities, there being three grease cups arranged on the ends of ducts which are so located in front of the cross member that they may conveniently be reached after raising the front

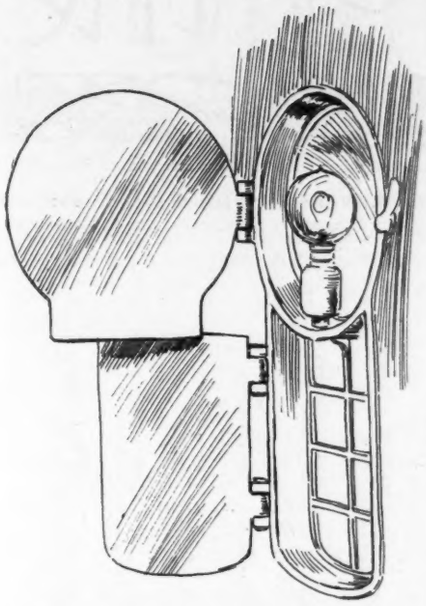


REAR END OF THE NEW COLUMBIA TORPEDO ROADSTER, SHOWING ITS CAPACIOUS BAGGAGE CARRYING FACILITIES



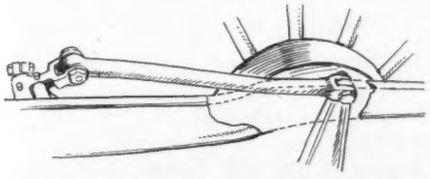
FACILITIES PROVIDED FOR OILING BEARINGS AT FRONT END OF STEARNS TORSION TUBE AND DRIVE SHAFT

That Add to the Enjoyment of Motoring



CONVENIENT SIDE LIGHT AND VENTILATOR ON EITHER SIDE OF FRANKLIN DASH

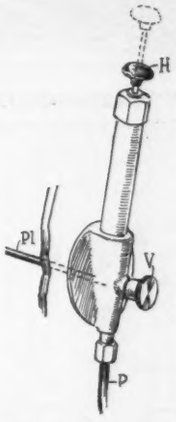
floor boards. One grease cup and duct oils the left torsion-tube yoke and front propeller shaft bearings, another one the universal joint at the front end of the propeller shaft, and another the right front



REAR AXLE EXTENSION FOR COLUMBIA RADIUS ROD SUPPORT

end of the right torsion-tube yoke bearing.

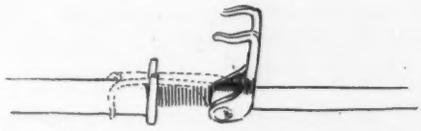
The Franklin dash lamps are built right into the dash, just above the ventilator, so that when the door of the lamp is opened from the inside the bulb is very accessible and light is diffused behind the dash for the convenience of the occupants of the front seats if desired.



DEVICE MOUNTED ON MITCHELL DASH FOR PRIMING MOTOR TO FACILITATE STARTING IN COLD WEATHER

An interesting feature of a McIntyre model, illustrated herewith, is an auxiliary side lantern on a snap bracket, from which it can most readily be removed at will.

A unique radius rod construction is seen on the 1911 Columbia cars, the rear



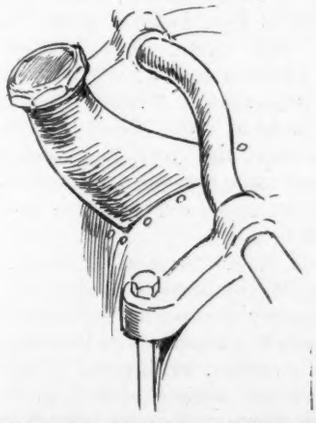
SIMPLE CLASP ON COLUMBIA BRAKE RODS ALLOWING QUICK AND EASY BRAKE ADJUSTMENT

ends of the rods being attached to an upwardly extending arm secured to the rear axle as illustrated. This is to bring the radius rod almost horizontal under ordinary driving conditions. In another illustration are shown baggage-carrying facilities of the new Columbia torpedo roadster; while in still another a simple locking device for the brake-adjusting rod is shown.

TURNBUCKLE USED ON BRAKE RODS OF MANY 1911 CARS

To facilitate filling of the gasoline tank of the American roadster when the trunk rack is occupied an extended filling nozzle is provided.

To facilitate starting the engine in cold weather, the Mitchell cars are fitted with a primary device shown above. By opening the valve V and raising the plunger H as indicated by the dotted line a quantity of gasoline is drawn from the supply pipe or carbureter through the pipe P and forced or sprayed into the intake manifold through the pipe P1. In



AMERICAN ROADSTER'S GASOLINE TANK FILLER EXTENSION FACILITATES FILLING OF TANK WITH BAGGAGE RACK OCCUPIED BY TRUNKS OR BAGS

Franklin Dash Light
Columbia Radius Rod Support
American Tank Filler.
Mitchell Priming Device
Columbia Brake Rod Clasp
Owen Spark Plug Switch
Maxwell Adjustable Fan Bracket

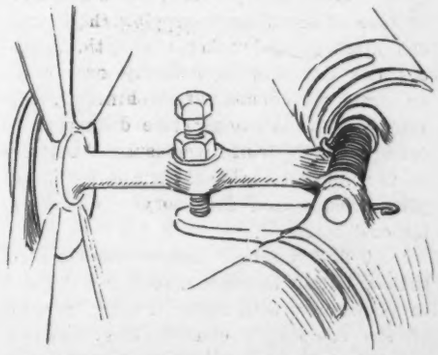
another illustration is shown the turnbuckle provided for the adjustment of Mitchell brake rods, a feature which is quite popular for this purpose on 1911 cars.

A very commendable feature of the Owen ignition system is to be seen in its simple high-tension spark plug connection or switch, designed to simplify

CONVENIENT AND SUBSTANTIAL SPARK PLUG SWITCH AND CONNECTOR OF OWEN CAR MOTOR

testing of the plugs and make easy their removal for cleaning.

A new type of fan belt adjustment is to be seen on the Maxwell cars; the bracket is pivoted in lugs on the top of the water manifold, with a coil spring to secure it against vibration, and a set screw with a locknut having its end resting on a little bracket provided to raise or lower the bracket.



SHOWING FEATURES OF NEW ADJUSTABLE FAN BRACKET ON MAXWELL CARS. THIS CONSTRUCTION PERMITS OF THE USE OF ENDLESS BELTS WHICH MAY READILY BE ATTACHED WITHOUT REMOVING THE FAN BRACKET, THE PULLEY BEING ON THE FORWARD FACE OF THE FAN INSTEAD OF BETWEEN THE FAN AND ITS SUPPORT

The Realm of the

RECORDS MADE BY WARREN-DETROIT COMMERCIAL WAGONS WHICH WERE EMPLOYED

FIRMS AND BUSINESS	*Burghardt Bros. Bakery	*Mich. Steam Laundry Co. Laundry	*Thos. Barlun & Son Butchers	*A. Peters & Co. Dyers	*B. Schroeter Florist	*Chas. J. Guthard Grocer	*Mich. Steam Laundry Co. Laundry	*John Blessed & Son Grocer	*O'Neill & Hoffner Grocers	*Goudie Market Grocers	*Abend Post Paper	*Pierce Bros. Grocers	Barker Bros. Furniture	City Dye Works Dyers	J. R. Lane Co. Dry Goods
Total hours in service	8	8	9	8	4	10	10	10	4	10.5	3	8.5	7.5	11	9.5
Total mileage	30	30	52	59	28	59	25	60	17	53	12	31	44	65	41
Cost of drivers' time	$2.20	$2.20	$2.48	$1.80	$1.10	$2.75	$2.75	$2.75	$1.10	$2.63	$0.83	$2.13	$2.75	$2.75	$2.75
Cost of oil, in cents	5	9	9	5	4	9	9	5	3	9	1	6	10	7.5	10.5
Cost of gasoline, in cents	48	28	78	76	38	48	31	57	38	57	16	43	88	88	58
Depreciation per days, in cents	72	72	81	72	36	90	90	90	36	94	27	75	80	80	80
Average length of stops, in minutes	2.5	2	2.66	3	3.2	2	2.33	1.8	2	3	3.2	3	4	3.7	3
Number of stops	94	106	69	93	20	62	112	115	88	70	26	78	21	58	40
Condition of weather	St'rmy	Fair	St'rmy	St'rmy	Fair	Good	Good	Fair	Snow	Snow	Fair	Fair	Fair	Fair	Fair
Approximate weight carried	700	400	600	600	100	400	400	575	450	300	300	100	250	250	250
Advertising value, in cents	52	52	59	52	27	65	65	65	26	70	24	55	100	90	80
Date, 1911	1/27	1/7	1/10	1/21	1/28	1/16	1/16	1/15	1/13	1/17	1/22	1/18	3/1	3/2	3/6

* Detroit concerns; all others in Los Angeles, Cal.

IN PACKING HOUSE SERVICE

Believing that the business world wants facts when it comes to demonstrating the efficiency of the commercial motor wagon, the Warren Motor Car Co. recently compiled statistics which show just what Warren-Detroit light delivery wagons have done in actual service

IN a comparison of gasoline vs. horse flesh, C. C. Colt, president of the Union Meat Co., of Portland, Ore., recently has made some interesting experiments. In the handling of its vast business the Union Meat Co. has imperative need of prompt and efficient service, with speed in delivery as one of the first essentials.

"And it is gasoline rather than horse flesh that is solving our problems for us," says Mr. Colt. "With our packing house and supply source 7 miles distant from the business district to which we make our deliveries, our transportation facilities must be of the best, as speedy as possible and systematized to the utmost degree. Every day we must move hundreds of tons of fresh meat, supplying the various markets and butcher shops throughout the city and slow delivery or delay en route would mean far-reaching inconvenience. It is an imperative duty to be prompt in delivering wholesale supplies to the retailer, so that he, in turn, can give prompt and satisfactory service to his customers.

"At first we used heavy wagons altogether, but in December, 1909, we decided to experiment with motor trucks. Several of the company's officials had been using passenger cars for convenience in getting to and from the plant and over the wide territory of the company's business we had found gasoline almost invaluable in connection with our duties, so we experimented with the motor trucks for handling our vast daily output of dressed meats.

"We have found that we can operate the gasoline-driven trucks, with their great superiority of speed and service, at the same expense, perhaps even a little less, than we could our wagons. Our only regret is that in purchasing our motor trucks we did not order vehicles of greater capacity.

"Our experiment with motor trucks has taught us that the light truck is not economical where there is a considerable volume of business to be handled. In adding to our motor service in future we will order trucks of a capacity not less than from 3 to 5 tons, as the cost of gasoline a mile is approximately the same, and we believe the cost of maintenance on a more heavily constructed truck will be proportionately less than on the lighter type, besides getting the additional tonnage capacity, which cuts the expense per hundred pounds very materially."

As an instance of what a heavy truck can do in the prompt transportation of heavy loads, Mr. Colt tells how an emergency was met recently.

"Delay in delivery of a Portland car from our packing house at North Portland," said he, "necessitated some quick work and we hired a big motor truck to make a special trip for it. The truck left Portland at 10 a. m., covered 7 miles to the packing house, took on 9,500 pounds of our products and had the cargo back to Fourth and Hoyt streets unloaded by 1 p. m., covering 14 miles and including loading and unloading of more than 4½ tons in 3 hours. Compare this with what a team of the best draught horses could do and you will have some idea of the superiority of gasoline over horse flesh in our business."

NEW SERVICE FOR CARS

Northwest fires have become less of a menace to life and property since the United States government furnished the forest rangers with motor cars in the vicinity of Portland, Ore., where great conflagrations have occurred during the past year. The United States rangers have done effective service, which would have been impossible if they traveled afoot or on horseback. The shovel and the axe, which until this year have been almost the only paraphernalia they carried, have given away to more modern tools and methods.

When E. E. Cohen, the Portland agent of the Maxwell-Briscoe Motor Co., urged the forestry division to buy cars for the government woodsmen and later sold some for this service, he initiated a saving of millions and created a feeling of much greater security. Now the rangers are real fire-fighters. Spades, picks, axes, dynamite and a dozen other fire weapons are carried in the Maxwell cars at all times and

Commercial Car

IN THE SERVICE OF THIRTY-SEVEN BUSINESS HOUSES IN DETROIT AND LOS ANGELES

Z. L. Parmalee Co. Elec. Fixtures	Berlin Dye Works Dyers	Brents' Furniture	O. C. Saakes Florist	Wm. H. Hoegee Sporting Goods	Pease Bros. Furniture	Diamond Laundry Co. Laundry	Excelsior Laundry Co. Laundry	Parmelee Dohrmann Co. China	Acme Dye Works Dyers	Western Wholesale Drug Co. Drugs	Newmark Bros. Teas, etc.	H. Jevne Co. Grocers	Hollywood Hdwe. Co. Hdwe.	Puritas Laundry Co. Laundry	Lyon, McKinney Smith Co. Furniture	American Dye Works Dyers	Electric Laundry Co. Laundry	Edw. Manebach & Co. Liquors	H. R. Tibbetts & Co. Paints	Drivers' Independent Laundry Co. Laundry	Hygienic Laundry Co. Laundry
8.5	9	7	7.5	7	9	10.5	8.5	9	5	8.5	7.5	7	7.5	8	7.5	8	10	6	7.5	8	7
40	75.1	44	50	53	47	43.5	27.5	69.5	29	26	39.5	36.5	49.5	39	55.5	51	34	39	43.5	26.5	20
$2.75	$2.75	$2.75	$2.75	$2.75	$2.75	$2.75	$2.75	$2.75	$2.75	$2.75	$2.75	$2.75	$2.75	$2.75	$2.75	$2.75	$2.75	$2.75	$2.75	$2.75	$2.75
5	10.5	5	10.5	10.5	10.5	10.5	12	10.5	5	5	10.5	10.5	7	5	8	10.5	10.5	8	10.5	5	5
50	91	50	66	66	66	49.5	33	78	33	31	47	43	45	43	46.5	54	43	31	46.5	31	19
80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80
16	3.3	7	2	3	7	2	3	1.6	3.6	1.3	1.8	4	3	2.5	7.5	2.5	3.2	2	2.6	2.4	1.5
11	31	8	13	33	11	101	93	75	23	51	39	37	18	39	7	38	47	23	17	27	31
Rain	Rain	Rain	Rain	Rain	Fair	Fair	Fair	Fair	Fair	Fair	Fair	Fair	Fair	Fair	Fair	Fair	Fair	Fair	Fair	Fair	Fair
200	350	900	200	400	800	900	1,000	750	500	1,700	800	800	200	500	500	300	500	500	1,200	500	400
95	95	90	100	100	90	100	100	100	90	100	100	100	100	100	100	100	100	100	100	100	100
3/3	3/4	3/7	3/8	3/9	3/10	3/11	3/13	3/14	3/15	3/16	3/17	3/18	3/20	3/21	3/22	3/23	3/24	3/25	3/27	3/28	3/29

Warren-Detroit power wagons, operating in the service of thirty-seven business concerns in Detroit and Los Angeles, made a remarkably fine showing in the way of economical operation and time-saving. The accompanying tables show the scope of these operations

the capacity of a single ranger has been multiplied beyond calculation. Their patrol duty has been simplified, quickened and extended. A trip that formerly required a full day is now accomplished in a few hours.

The motor cars travel over the forest roads and lumber trails better than horses. Even the 100-foot stumpy stretches where the government cuts down the timber to restrict the spread of fires, have been negotiated with surprising speed. Where a small army was required to dig an effective fire trench a single crew of motor rangers now do the work with spade and dynamite.

USE FOR OLD CARS

A new departure in the disposal of second-hand or used cars, and one which is likely to be adopted by other manufacturers of high quality cars, has just been introduced by the Thomas B. Jeffery Co., of Kenosha, maker of the Rambler, in placing on the market a line of used cars which have been converted for delivery service. The company has this season taken in exchange from owners who have purchased 1911 Ramblers, a number of older models which are in excellent condition. These have been rebuilt and overhauled and some have been resold for pleasure purposes, but there has been opened a wide field for commercial cars and henceforth the majority of used cars will be equipped with delivery bodies for the use of contractors, laundrymen, builders and merchants. The idea is believed to be at least a partial solution of the second-hand car problem which is bothering all manufacturers and dealers.

TRUCK SAVES MONEY

The F. H. & A. H. Chappell Co., of New London, Conn., has figured out that a Packard motor truck cost it for up-keep and hire of one man $1,925 a year. The company says it will do the work of three teams, the maintenance of which would amount to $3,945. It says it has effected a saving of $2,000 a year by using the truck in the delivery service of its coal business.

REGAL RUNS A FACTORY

When the plant of the Minneapolis General Electric Co. was wrecked by explosion and fire recently, the city was without light for its streets and buildings and the factories were without power. A motor car came to the rescue of one of the largest industries in Minneapolis, furnishing all the power needed. F. P. Wallis, president of the Wallis Coach and Carriage Works, hit upon the idea. He called up Milton Brice, of the Regal Sales Co., the morning after the fire and had a Regal chassis sent over to his plant. Blocked up in position in the workshop, the Regal engine began its unaccustomed task without a kick. A belt around the flywheel of the motor engine connected the shafting on the ceiling. This shafting drove two furnace blowers, a drill press, trip hammer and emery wheels. From here the power was transmitted to the second floor, where it operated numerous machines in the woodworking and upholstery departments. A pipe connected with the muffler carried the exhaust out of the window. The motor was run continuously at high speed all day without the addition of a drop of water.

TRUCK PARADE PLANNED

Philadelphia is to have another demonstration of the serviceability, reliability, time-saving and economy of the commercial vehicle to the merchant and business man. On Thursday, June 8, the Philadelphia Inquirer will conduct a motor truck parade through the principal business thoroughfares of the city, concluding with an exhibition of the vehicles at the Belmont Driving park, Narbeth. The parade will not partake of the nature of a contest, but simply be a practical demonstration of the motor-driven vehicle's supremacy in the solving of the transportation problem. The itinerary will be mapped out next week. The success of the recent motor truck demonstration in New York was indirectly the cause for the Quakers taking up the proposition.

From the

HELPING the Tourists—The Lovejoy Novelty Works, of Laramie, Wyo., which is on the transcontinental route, has issued a road guide from Laramie to Rawlins, which it furnishes free to tourists stopping at either of its garages.

Grant's Alco Shows Speed—Trying out No. 18 Alco, which twice won the Vanderbilt, Harry Grant turned ½ mile on the Long Island motor parkway in :16⅘, which is equal to 107.8 miles per hour. Grant will run his car at Indianapolis.

Car Famine in Des Moines—Des Moines is now experiencing a great famine in motor cars. The sales during the spring were so heavy that already almost every dealer in the city has almost used his allotment of cars. During the past week no fewer than four of the big local dealers made trips into their respective factories to try and secure additional cars. This year's Iowa business promises to far outdistance that of any previous year.

Would Help Tourists—Motorists and business men of Neenah-Menasha, Wis., have enthusiastically sounded their approval of the plan broached by the Outagamie Automobile Club of Appleton, Wis., to reconstruct the main traveled highway between Appleton and the two twin cities, a distance of 5 miles. It is planned to pave the entire stretch with macadam and the chances are that the scheme will be carried out before the end of summer.

Motorists in Politics—Baltimore motorists proved good campaigners in the recent municipal election in this city, for it was largely through their untiring efforts that several loans looking to the improvement of Baltimore's streets were passed. One of these loans is the $5,000,000 paving loan and the other the $2,500,000 annex loan. With the use of the paving loan it has been figured that half of the city streets now paved with cobblestones will be improved with modern material within 6 years, while by the old method of appropriating a certain sum each year out of the tax levy for street paving it has been shown that it will require 60 years to complete a similar amount of improved paving.

Typographical Error Made—In the article on the lubrication of ball bearings, which appeared in Motor Age last week, reference was made to the New Departure Mfg. Co. of Bristol, Conn., but a typographical error called the concern the New Department Mfg. Co.

Run for Electrics—Simultaneously with the awarding of the trophies to winners in the recent social run of the club to Atlantic City the announcement was made on Tuesday night that the Quaker City Motor Club will conduct a run exclusively for electrics on Saturday, June 10. No further details have been perfected.

Election at Sioux City—At the annual meeting of the Sioux City Automobile Club, of Sioux City, Iowa, the following were elected officers of the club: G. O. Jamesson, president; L. H. Jones, vice-president; H. H. Everist, secretary; L. C. Lessenich, treasurer. Following the election, eight members were appointed to launch a membership campaign.

His Tongue Slipped—E. J. Kneen, of La Crosse, Wis., owner of a garage and a member of the Wisconsin assembly, got his foot into it while favoring the passage of a bill abolishing the state oil inspection department last week. Mr. Kneen argued that the present law is rarely observed and that the oil inspectors rarely enforce the law relating to the inspection and grading of petroleum products. During the discussion an oil inspector inquired of Mr. Kneen if he complied with the law requiring that a placard be posted in garages informing purchasers of the grade, test and quality of the gasoline. Mr. Kneen said he did not, whereupon the inspector noted his name and address and stated that a prosecution would be started immediately against Mr. Kneen.

Briscoe Will Buy Lunch — Benjamin Briscoe, president of the United States Motor Co., has offered to bear the expense of a luncheon at Dreamland, Coney Island, for the 5,000 orphans who will participate in the annual outing of the Orphans' Automobile Day Association of New York on June 7.

Delaware Gives Banquet—The Delaware Automobile Club, of Delaware, Ohio, held a banquet and reception at its new club rooms recently which was attended by Dr. C. L. Bonifield, president of the Ohio State Automobile Association. A number of others prominent in motor car circles were present. More than 100 attended the banquet, at which a number of toasts were responded to.

Cars In Michigan—According to a recent compilation by the secretary of state there are now over 17,000 licenses in use by Michigan owners of motor cars and motor cycles, the sum already accruing to the state this year being in the neighborhood of $100,000. A movement is under way to secure legislation which will permit this entire sum to be used in the highway improvement of the state. At present the receipts from licenses are turned into the general fund of the state. The highway fund is taken from this but there is no provision that the sum expended on highways should balance the amount spent for licenses. It is noteworthy that, at the time of the compilation, the number of licenses issued for 1911 exceeded the high-water mark of the preceding year by more than 5,000.

Menacing Bill in Wisconsin—R. W. Edden was elected president of the Janesville Automobile Club of Janesville, Wis., at the annual meeting. Other officers elected are: Vice-president, E. A. Kemmerer; secretary and treasurer, Earl T. Brown. The club appointed a committee to confer with the Janesville Industrial and Commercial League on the question of jointly sign-boarding all principal roads leading into the city, the signs to carry also a warning in relation to speed limits. M. C. Moore, of Milwaukee, president of the Wisconsin State A. A., was a guest of the club at this meeting and spoke on legislation, asking especially vigorous support on the measure known as No. 958, which has passed the senate and may pass the assembly, and which purposes to destroy the defense of contributory negligence on the part of motorists in case of accidents and doubtless would result in the refusal of any insurance company to issue policies of liability insurance to any motorists in

School children at North Manchester, Ind., recently took part in a street parade. More than seventy-five cars were needed to carry the 1,000 youngsters. Factories were closed and the town gave itself up to jollity. Ollinger &Warvel promoted the affair

Four Winds

Wisconsin. The state association is fighting the bill with all its might, but is finding considerable favor toward the bill. This is perhaps the most important measure with which motorists of Wisconsin have to contend.

Bill a Joke—Making a joke of it, Representative Cowan of Ohio said he had fixed his bill to increase the registration fee for motor cars of over 30 horsepower so that it would not apply to any car in Putnam county, and the committee had fixed it so it would take in all the cars in Putnam. On his motion, the house indefinitely postponed the bill.

Bloomington Chooses Date—The date for the annual reliability run of the McLean County Automobile Club, of Bloomington, Ill., has been fixed for May 24, starting at 7 a. m. The rules this year are exciting some criticism, but it is believed that there will be few withdrawals despite the severity of some of the restrictions. A full stop is required at all railroad crossings. The route circles around Bloomington and covers the principal towns of the county, the total distance aggregating 159 miles. The heavy hills of western McLean county which proved such a hardship last year, are omitted in this year's contest.

Helping Out—The climax thus far in good roads agitation in Iowa came when the citizens of Valley Junction, a railroad suburb of Des Moines, came forward with an offer of $20,000 to put the Polk county stretch of the famous river-to-river road in trim. The offer is contingent on the city and county expending $3,000 to cut down the grade of Grand avenue hill, that section of the road which passes through the finest and richest residence district of Des Moines. The board of supervisors has already agreed to stand half of this expense. A large portion of the sum to be expended will be used for putting a coat of gravel or shale upon the road and the building of a branch line of the road through Valley Junction.

Obeying the Law—The number of arrests in Milwaukee, Wis., for violating the speed laws and a new ordinance requiring all motor cars to stop before passing a street car which is discharging or taking on passengers, is steadily decreasing, and this improvement is to be attributed directly to the efforts of the Milwaukee Automobile Club to enforce observance of the laws. Only a few arrests have been made for violation of the street car law, and these, it is believed, were due to ignorance of the statute on the part of drivers. Officials of the motor club believe that by pushing their law and order campaign further they will soon make arrests the exception rather than the rule. The speed law will naturally be violated frequently, but with a prison sentence now threatening on second offense, these violations, too, will decline.

Saving the Gasoline — The Goodrich Steamship Co., which plies between Muskegon, Grand Haven and Chicago, has installed tanks on its boats so that hereafter it will be unnecessary to waste the gasoline in the tanks of motor cars which are shipped over that line.

Blazing Canadian Trail—A Halladay 40 touring car, driven by George Daubner, and carrying besides the driver, the official scout, the photographer, and a press representative, will leave Winnipeg about May 25 to lay out the route of the Modern Power Canadian national reliability tour, which will take place in August.

Club at Evansville—There is a new motor club at Evansville, Ind.—the Evansville Automobile Club, which, according to its charter, has been organized to promote "reasonable nondiscriminating regulation of motor vehicles." The club has been incorporated without capital stock and the directors are W. A. Koch, August Brentano, J. F. Carson, D. S. Bernstein, P. B. Fellwock, F. W. McNeeley, H. E. Hulsman, Alfred Green and E. D. Luhring.

Novel Road Guide—A novel road guide is to be put into circulation by the Columbus Automobile Club, of Columbus, Ohio. The book is now being arranged for and will be one of a system that is now being published in Illinois and Indiana. The book is known as the interchangeable road guide, each person holding one having permission to change it for the book of the state in which he happens to wander while making a tour. The best feature of the book is the map which it contains. The first map shows the counties in the extreme northern part of each state, the road connecting each county seat, and the best routes to take; the next map shows the middle counties, and the last the counties in the southern part of the state.

Pernicious Practice — The Columbus Automobile Club, of Columbus, Ohio, has taken steps to stop the practice of boys riding bicycles hitching on to motor cars. Juvenile Judge Black has been enlisted in the campaign and orders have been issued to the police department to put a stop to the practice. Several accidents have resulted from the practice recently.

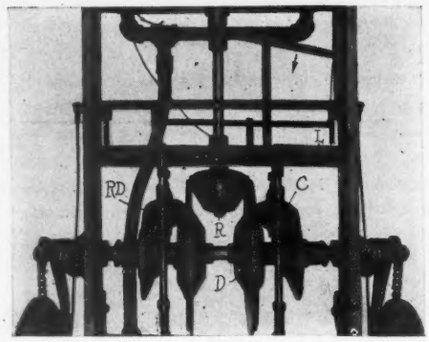
Carrying on Good Work—Road sign posting is the principal hobby these days of members of the Automobile Club of Maryland. They have completed 34 miles of the route from Baltimore to the Delaware line. From there the Delaware motorists will complete the work of posting signs to Philadelphia. The route taken by the motorists is from Baltimore, via Belair, Havre de Grace, Newark and Wilmington to Philadelphia. Signs are posted at intervals of from 1 mile to 5 at crossroads, forks, etc., while several slow-down signs were put in position to warn motorists along the route.

Going at It Right—At a convention of good roads enthusiasts at Fond du Lac, Wis., last week, the Fond du Lac County King Road Drag Congress was formally organized to promote highway improvements in the county. G. N. Mihils was elected president and the chairmen of all townships were elected vice-presidents. F. M. Givens is secretary and John Reilly treasurer. Regular meetings will be held, at which the town chairmen and highway commissioners will make reports. It is planned to cover the entire county with King split log drags and keep at this work after every rain or snow the year around. In this way it is hoped to make the Fond du Lac county highway system the best in the northwest.

In Lorraine, Kansas, the townspeople are strong supporters of motoring. The population is only 176, yet when a spring opening was held recently, twenty-two Velies owned in and around the town took part in the demonstration

Current Motor Car Patents

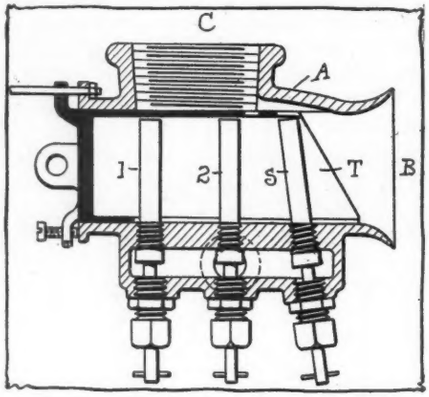
DAVIS Roller Clutch Transmission—No. 911,947, dated February 9; to John P. Davis, Chicago—This patent relates to a friction transmission mechanism, illustrated herewith, whose distinctive feature is the simple and effective arrangement of its transmission members. As shown in the illustration, the series of cones and disks are arranged for low speed forward. The direction-cone-roller C, operated by the lever L, is jammed between the disks D and D1, and the driving cone roller R, operated by the lever V, is in contact with the driving disks D1 and D2 near their outer edges; thus by means of an automatic clutch mechanism provided the disk D2 drives the chain to the left wheel in the forward direction, and the disk D1, which turns in an opposite direction, drives the right-wheel chain in the forward direction by transmitting the power through the cone roller C and the outer disk D. To increase the speed, the driving cone R is shoved inward. A notable feature of the design is that when the cone is shoved all the way in for highest speed, the friction contact between it and the disks D1 and D2 is greatly increased. The direction cone RD is now disengaged, it being used for reverse speed by the operator of the motor vehicle.



DAVIS ROLLER CLUTCH TRANSMISSION

Perrin Magnetic Spark Plug—No. 989,924, dated April 18; to Frederic S. Perrin, Brooklyn, N. Y.—This plug is of the magnetic type, designed to be used with a low-tension current. It has a non-magnetic shell S, a tubular soft iron core C attached to the shell, a coil of wire W surrounding the core, a conductor R in circuit with the coil, which extends through and is insulated from it and which has an extension E projecting into the cavity of the shell, and a soft iron armature A adapted to move upon this extension, which normally rests on an arm M at a point outside of the center of gravity of the armature, so that when resting upon this support it inclines against the projecting extension, shown in the illustration.

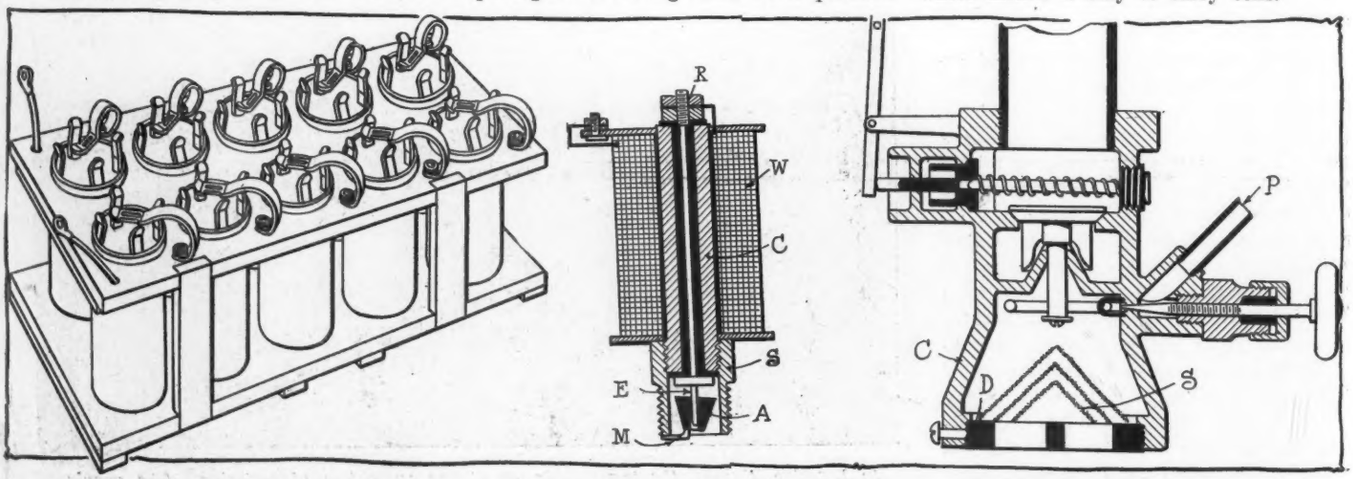
New Carbureter Design—No. 989,697, dated April 19; to Lorin L. Cutler, Danville, Ill.—The carbureter to which this patent relates, as illustrated, comprises a casing C, having an air inlet at its lower end, a vapor outlet at its upper end, a disk D removably mounted in the air inlet and having openings through it, a series of concentric conical screens S having their bases supported upon the disk over its openings and having their walls parallel with and spaced from each other, and a liquid fuel supply pipe P leading through the side of the casing and having substantially semicircular branches pierced with a ring of apertures standing above the wall of the uppermost screen, as is shown in the illustration.



SPRUNG'S MULTIPLE-JET CARBURETER

Multiple-Jet Carbureter—No. 989,515; dated April 11; to E. Sprung and H. Rose, Detroit, Mich.—This carbureter has a float chamber and in connection with this a cylindrical mixing chamber A, with an air intake B, a mixture outlet C, a cylindrical non-rotative throttle T which can be moved endwise, a series of gasoline supply tubes or nozzles, 1, 2, s projecting diametrically into the throttle and terminating near apertures in the throttle at the mixture outlet, the full nozzle 3 being in constant open communication with the mixture outlet, the full nozzle s being in constant 3 and 2 being less than the distance between the discharge ends of 2 and 1, means for limiting the closing movement of the throttle T, and adjusting means for limiting the opening movement of the throttle on the device.

Convenient Battery Holder—No. 989,738, dated April 18; to George Newcomb Waterbury, Jr., Washington, D. C.—This patent covers a combination of a cell-holder for a dry cell electric battery and electrical spring contacts S disposed adjacent thereto for effecting an electrical contact with the positive terminals of dry cells, and means on this spring contact for engaging either a vertical positive terminal or a horizontal positive terminal. The contacts for the positive pole of the dry cells not only serve to hold the cells in place and insure good contact but they are pivoted to the holder and may be readily swung to one side for removal or replacement of the cells. Motorists who use dry cells on their cars will appreciate this idea, which makes it easy to carry cells.



WATERBURY'S BATTERY HOLDER, PERRIN'S MAGNET IC PLUG AND CUTLER'S CARBURETER DESIGN

The Motor Car Repair Shop

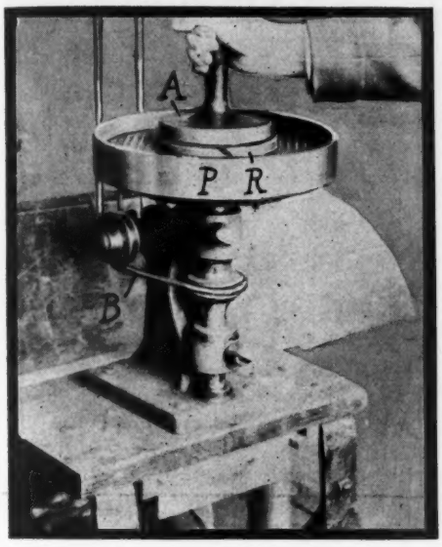


FIG. 1—DRESSING DOWN PISTON RINGS

IN the illustrations shown on this page a few hints are given on how accurate workmanship is obtained and facilitated in the motor assembly department of the E. R. Thomas company. These illustrations are reproduced for two reasons: One, to give many repairmen throughout the country an idea as to how they might improve their own methods of doing the same kind of work; and the other, to impress all readers with the accuracy that is required in fitting piston rings or aligning the crank and camshafts of a motor.

Fitting Piston Rings

In Fig. 1 is shown a very simple machine of special design which is used to facilitate grinding down the edges of piston rings so that they will fit in the grooves in the piston. The device comprises a revolving plate P which has a griddled surface; that is, it has shallow grooves about $\frac{1}{16}$ of an inch wide and deep which run straight across the plate in opposite directions, dividing the surface into ½-inch squares, so that the plate has a griddled appearance. These grooves are filled with emery and oil. The plate P is mounted on a spindle which is supported in two substantial bearings and driven by a round leather belt B from the shafting overhead. When in use a piston ring R, Figs. 1 and 2, is placed on the arbor A, and pressed down onto the plate as illustrated. Thus the thickness of the rings is quickly reduced and a smooth and even surface is obtained on the edge of the ring. A sectional drawing of the plate, with the respective positions of the ring and arbor upon it, is shown in Fig. 3, though the grooves are a little large in proportion to the size of the arbor and diameter of the ring. A piston ring should fit snugly in its groove so that it can slide about easily, but there should be no lost motion; that is, it should not be possible to move it up and down in the groove. A machine of this kind, of course, would hardly be practicable in the ordinary motor car repair shop; but the arbor, which is of wood, should be very useful, and could be easily turned up in a lathe. The ring could then be placed on the arbor, a sheet of fine emery cloth laid on surface plate or other perfectly flat surface, and the edges of the ring then rubbed on the emery cloth.

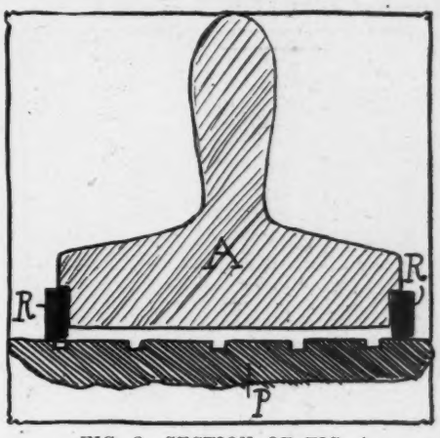


FIG. 3—SECTION OF FIG. 1

Aligning Crank and Camshafts

Figs. 2 and 4 show a means employed to test the accuracy of the alignment between crank and camshafts of a motor car. Two gauge arbors are pressed onto the ends of the camshafts as illustrated, and a third one with the measuring gauge A on the end of it, is placed on the end of the crankshaft. With these devices in place the crankshaft then is turned so that a little spindle contacts with the arbors of the camshafts. The details of this measuring device are shown in Fig. 2: S represents the arbor on the end of one camshaft, S1 represents the other, and D the point where the device is pivoted on the end of the crankshaft which is indicated by the dotted circle around the letter D. As illustrated, the point P of the spindle is in contact with the camshaft arbor S, and a hand N which registers with graduations of 1-1000 of an inch on the dial G. Now, to be absolutely correct, it must be possible to swing the point P of the instrument into contact with both of the shaft arbors S and S1 without causing a variation of more than a couple of thousandths of an inch one way or another from the graduation marked O.

The ordinary business or calling card is about 10/1000 of an inch thick, so one can readily see that when accuracy within limits of 4/1000 of an inch is required, the scraping in of a motor crankshaft or tightening of crankshaft bearings is not a job for an amateur. At B, Fig. 4, is shown another instrument, which also is provided with a graduated dial and indicator G; this instrument is designed to rest on the edge E of the case, as shown, and enables the workman to know when the shaft has been scraped-in to the required depth. This instrument is used on both ends of the shaft, and the other instrument A is not employed until the shaft has been proven to be in perfect alignment with the planed surfaces of the case. It is obvious that if these precautions were not taken, it would be a very simple matter to get the shafts sufficiently out of alignment to make the gears noisy.

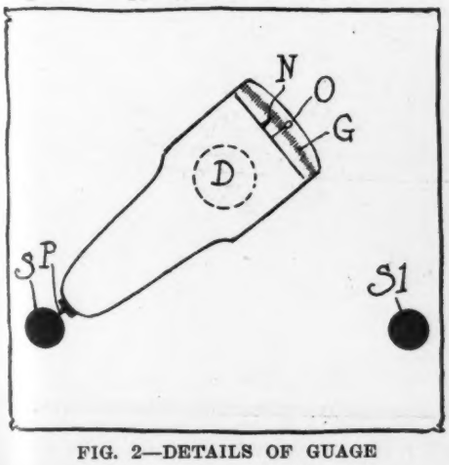


FIG. 2—DETAILS OF GUAGE

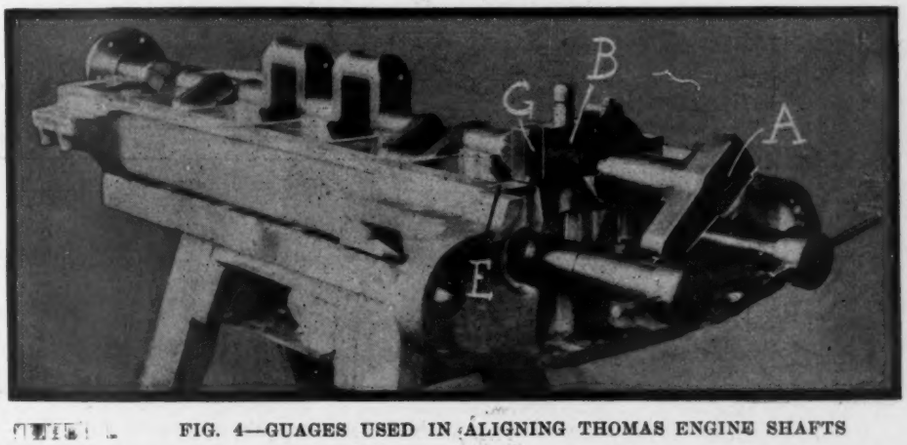


FIG. 4—GUAGES USED IN ALIGNING THOMAS ENGINE SHAFTS

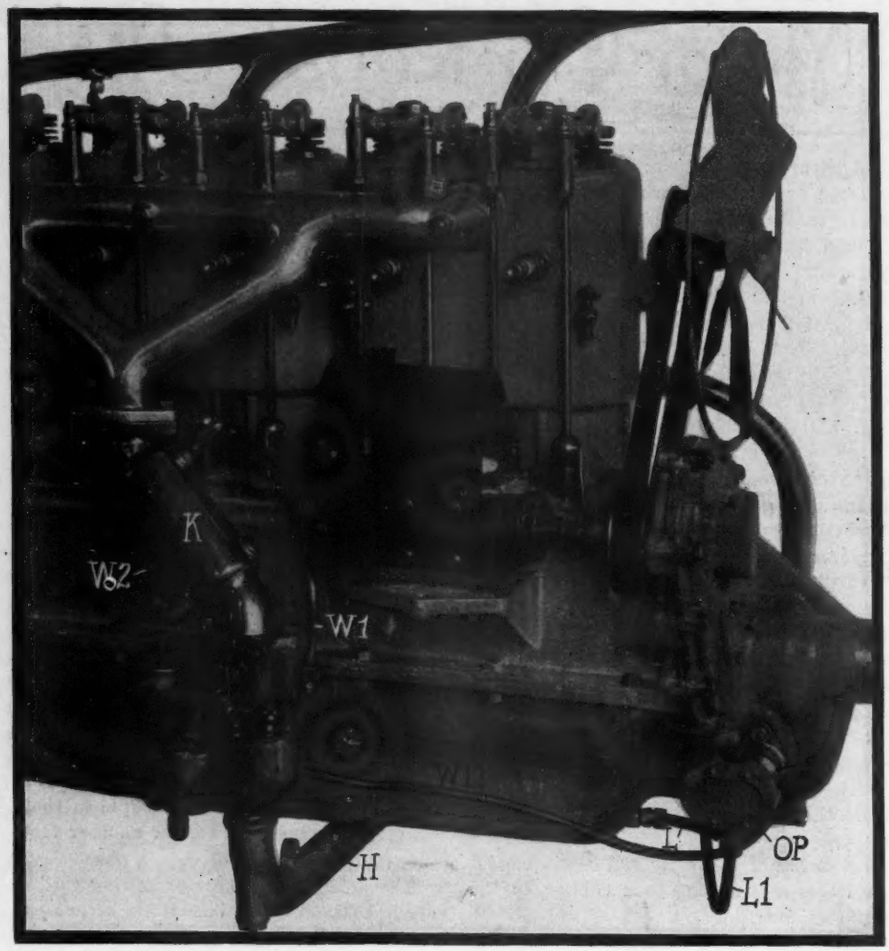


FIG. 1—RIGHT FRONT END OF THE NEW NANCE SIX-CYLINDER MOTOR SHOWING WATERJACKET ON CARBURETER AND ON INTAKE PIPE

Nance New Six-Cylinder On the Market

A NEW six-cylinder car has been brought into the market of the popular-priced cars by the Nance Motor Co., of Philadelphia.

The Nance cars are made in the form of four and five-passenger touring and two-passenger runabout types, all of fore-door body construction fitted to a single standard chassis design.

The features of this chassis are a unit power plant comprising a motor with its six cylinders cast in pairs and having a bore and stroke of 3⅝ and 4 1/16 inches respectively, a multiple-disk clutch, and a selective sliding gearset giving three forward speeds. This unit is suspended at a single point from a cross member of the frame in front and by two legs, opposite the flywheel housing at the rear

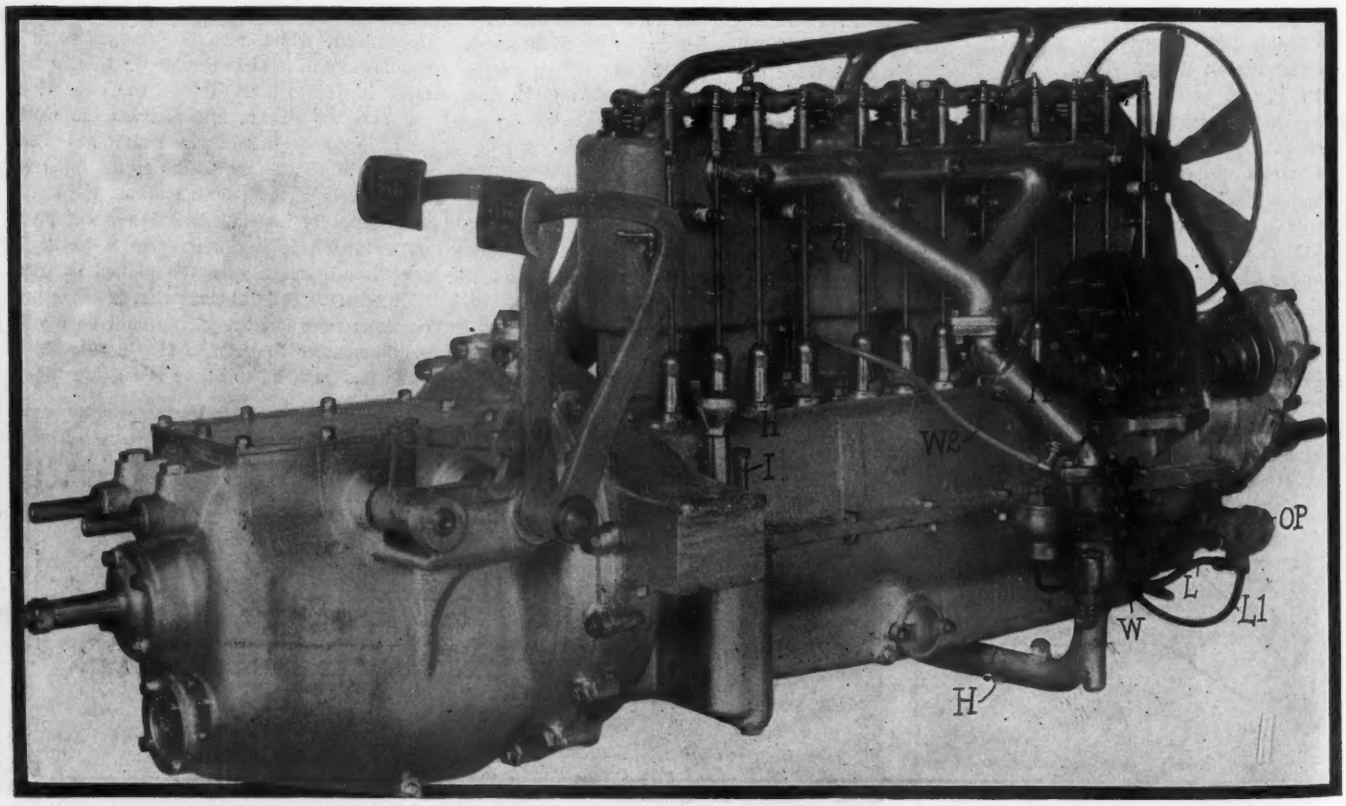


FIG. 2—RIGHT SIDE VIEW OF THE ENTIRE UNIT POWER PLANT OF THE NEW NANCE SIX SHOWING THE SIMPLICITY AND ACCESSIBILITY OF EXTERNAL FEATURES

Offering for 1911 of Philadelphia Concern

end of the motor crankcase, directly to the side members of the frame. A propellershaft enclosed in a torsion tube transmits power from this unit to the floating type of rear axle. An I-beam front axle with Elliott type steering knuckles is employed; semi-elliptic and three-quarter scroll elliptic rear springs support a pressed channel steel frame. The steering gear is an adjustable double worm and nut type, operating through an adjustable rack and sector; the wheels are equipped with 34 by 4-inch tires, with options on 36 by 4-inch.

As for details, the motor is a valve-in-the-head, water-cooled type, with the valves all operated through rocker arms and push rods from a single camshaft enclosed within the crankcase of the

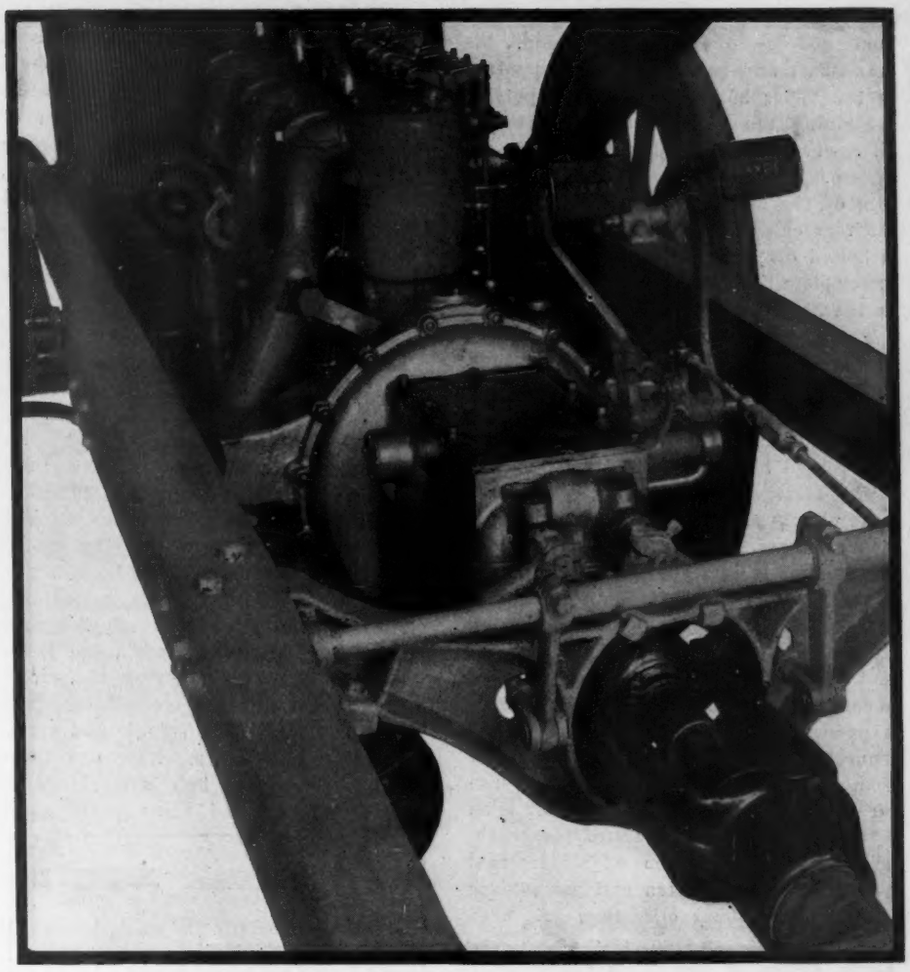


FIG. 3—A VIEW OF THE MID-SECTION OF THE NANCE SIX IN WHICH THE YOKE DESIGN AT THE FRONT END OF TORSION TUBE IS ILLUSTRATED IN DETAIL

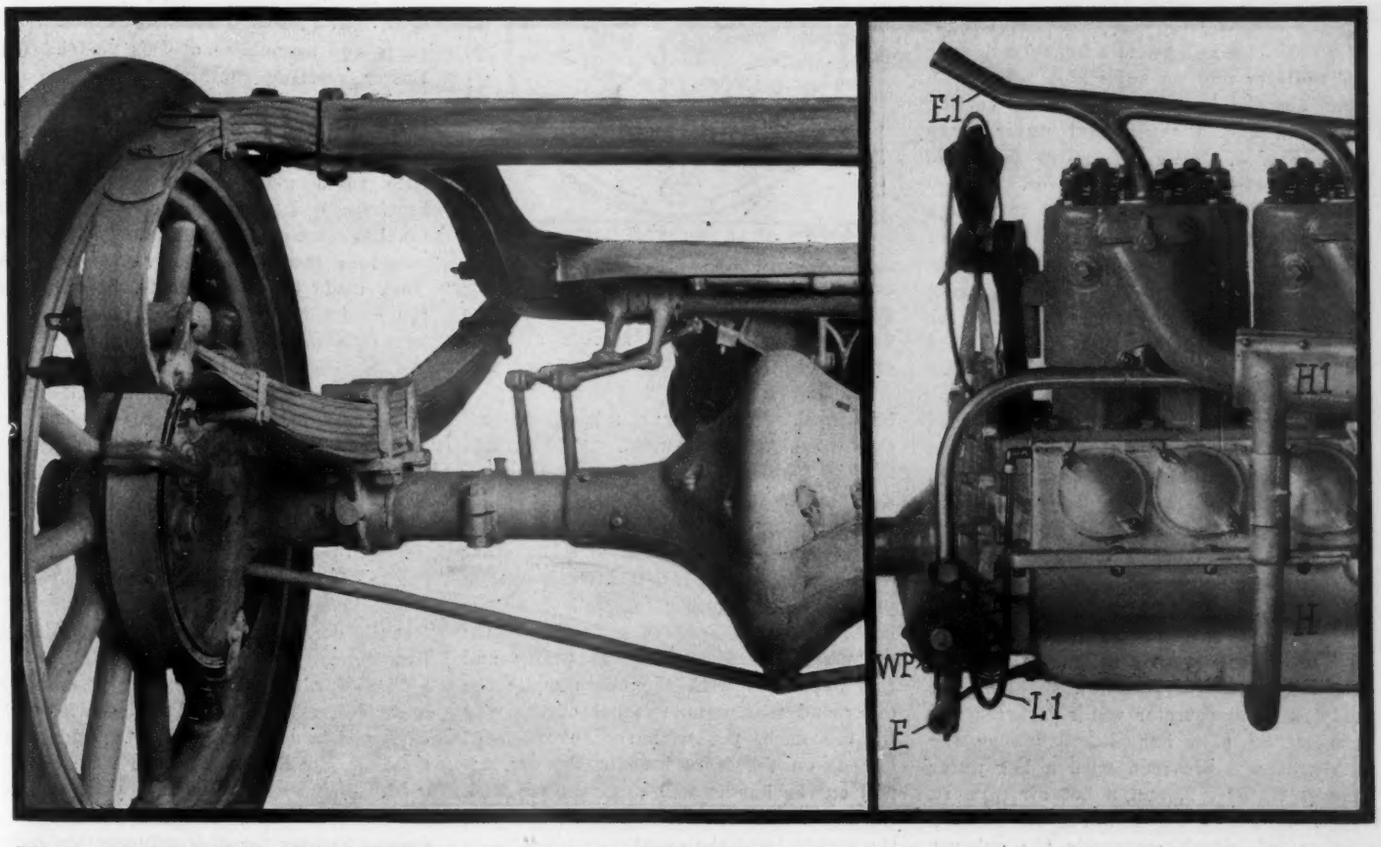


FIG. 4—SHOWING REAR SPRING DESIGN AND FEATURES OF BRAKE AND AXLE CONSTRUCTION. FIG. 5—FEATURES OF COOLING, ING, CARBURETING AND OILING SYSTEMS FIG. 5—FEATURES OF COOLING, CARBURETING AND OILING SYSTEMS

motor. This crankcase is of cast aluminum and is divided horizontally, the crankshaft and camshaft being supported in the upper half and the lower portion containing the splash compartments and oil reservoir of the circulating lubrication system. The flywheel housing and rear legs of the motor are cast integral with the rear end of this case and the gearset is bolted directly to the flywheel housing to complete the unit construction as shown in the accompanying illustration.

The crankshaft of the motor is a drop forging mounted on four bronze bearings. The connecting rods also are drop forgings and carefully balanced when assembled; and the timing gears are cut from drop-forged blanks and hardened.

The features of the oiling system are quite clearly shown. The oil pump OP is mounted externally at the front end of the motor. It is a spur-gear type driven by gears and the shaft S off the motor crankshaft. This pump draws the oil from the oil reservoir through the oil lead L, and forces it through the lead L1 to each of the main bearings, from whence it passes through the crankshaft to the connecting rod bearings. The overflow from these bearings lubricates the cylinder walls and maintains a constant level in the splash compartments of the crankcase for the lubrication of all internal mechanisms. The clutch and gearset are oiled by individual oil baths. A large filler pipe h at the right rear end of the motor, shown in Fig. 2, is conveniently located for replenishing the oil supply and directly opposite a float indicator I is provided to show the quantity of oil in the reservoir.

In the cooling system a honeycomb type of radiator and an adjustable belt-driven fan absorbs the heat from the cooling medium, and a centrifugal water pump WP, Fig. 5, draws the water from the lower portion of the radiator, through the connection E, and forces it up through a simple water manifold into the lower portion of the cylinder jackets, from which it passes out at the top opposite the exhaust valves and back into the radiator through the manifold E1. In this illustration the oil lead L1 is clearly shown, which conducts the oil from the pump up to a duct in the upper left-hand portion of the crankcase. The large hand hole plates for inspection of the internal mechanisms of the crankcase also are quite clearly shown in this illustration.

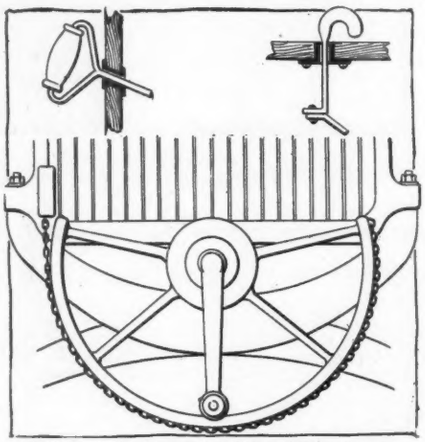
A Bosch dual ignition system is employed with a battery and one set of plugs.

In order to insure more complete vaporization of fuel, even in cold weather, with the low grades of fuel now supplied, not only is the carbureter water jacketed but the intake pipe immediately above the carbureter is provided with a hot water jacket K, Fig. 2, and a hot air pipe H, Figs. 2 and 5, draws warm air from a jacket H1, which surrounds the exhaust pipe. Thus the air entering the carbureter is warmed, the mixture is warmed in the carbureter and kept warm as it passes up through the inlet pipe. The pipe H has a shutter in it for regulation in the summer time. Water for the jacket of the inlet pipe is taken from the main inlet water manifold by the pipe W2, and on leaving at the top of this jacket passes to the carbureter jacket through the uppermost pipe W1, and returns to the inlet pump connection E by means of the lowermost pipe W1.

STARTER FOR FORD CARS

The Neher engine starter, marketed by L. M. Neher, Milford, Ind., is an attachment by means of which the engine is turned over and started from the driver's seat. The construction shown in the illustration is especially adapted to the model T Ford car. The starter does not prevent cranking in the usual way by the old crank, but it provides an additional and more easy way of starting the engine.

The spindle shown is slipped over the shaft of the regular crank, and has a slot along one side allowing the crank in-and-out motion to engage and disengage the engine shaft. This spindle and crank always rotate together, either one turning the other. The hub is machined to fit over spindle and these parts could



MOTOR STARTER FOR FORD CARS

each rotate independently in either direction were it not for a ball ratchet, which engages and turns the spindle and the crank whenever the hub is rotated forward, but is entirely free when turning backward. The outer rim is of channel steel with groove outward, and is secured rigidly to the hub by five steel spokes as indicated in the drawing. A cable chain lies in the groove, one end being fastened to its right end, and the other end passing upward and inward over a pulley connecting to a pull rod under the hood. The pull rod in normal position extends forward just to the pulley and there connects with the chain while the other end with handle is out of the way by the dash, yet within easy reach of anyone on the front seat of the car. A pull on the handle will communicate with the chain and will turn the rim, the hub, the spindle, and the crank.

It is only necessary further to have a means of having the crank engage the engine shaft while turning, and this is provided in a pedal connected on the foot board, as shown. The pedal furnished for Ford T cars connects in the slot of the brake pedal, so that no holes need be made in the floor or floor mat. A spring, not shown, pulls the hub backward and holds the chain tight at all times. In starting the engine by a pull on the handle the tension of this spring adds slightly to the necessary pull, but as the leverage is greater than with the regular crank, this is not noticed. The right foot is used on the pedal, and the right hand is used to pull.

MOTOR CAR LITERATURE

The Cleveland Automobile Club is demonstrating to the motoring world that it is a live wire and to this end has launched the initial number of the Cleveland Motorist, which comes to us in an attractive form.

The Westcott cars for the season of 1911 are described in a neat, attractive and conventional catalog. Full page and parts illustrations, together with the regular specifications, are shown.

An attractive three-colored catalog has been received describing the Atlas motors, manufactured by the Atlas Engine Works, Indianapolis, Ind. Full page illustrations feature this engine and its parts. It is bound in an embossed gray cover.

The Stevens-Duryea Co., Chicopee Falls, Mass., is mailing to the trade a set of three catalogs: The twenty-four-page brochure graphically features its square line drive as used on its six-cylinder cars. The forty-eight-page model Y instruction book illustrates and features in detail the parts and assemblies of this model. The Easter greeting contains a verbatim description from a recent issue of the Autocar.

"A Joy Ride" is the rather startling title to a most innocent-looking little brochure which the Columbia Motor Car Co. has issued. It is the story of a summer tour through Pennsylvania and New York made by D. P. Black, president of the Real Estate Trust Co., Pittsburg, Pa., in a Columbia car.

The Cole 30 for 1911 is simply and attractively described and illustrated in its latest catalog, which includes the conventional illustrations and specifications.

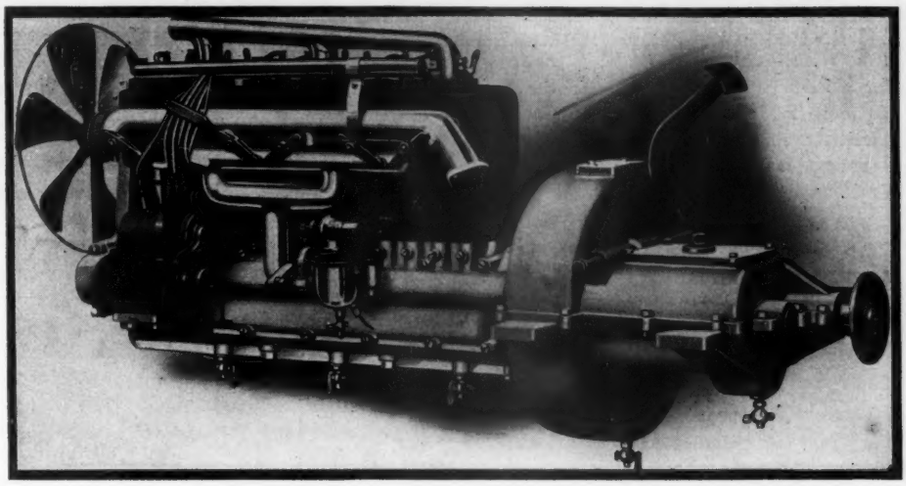
The Gray & Davis Co., Amesbury, Mass., illustrates and features its line of lamps in a 5½ by 9½ stiff-papered covered catalog.

The 1911 Glide cars, made by the Bartholomew Co., Peoria, Ill., are conventionally described in this company's latest literature.

The Gardner disk-grinding machinery and accessories are fully illustrated and described in a 128-paged catalog which the Gardner Machine Co., Beloit, Wis., has issued. Grinders for metals, grinders for the pattern shop, polishing stands and special fixtures for disk grinders are some of the types and accessories mentioned.

The Havers Six a New Car This Season

Made in Port Huron, It Is Offered in One Chassis But With Two Types of Bodies—Roadster and Touring Car—Details of Design



LEFT SIDE OF THE UNIT POWER PLANT OF THE HAVERS SIX

AMONG the new cars for this season is the Havers six, manufactured by the Havers Motor Car Co., of Port Huron, Mich. The chief feature of interest about this car is the use of a six-cylinder motor in a car selling at a medium price. Two bodies are fitted to the one chassis, a roadster and a touring car body.

The six-cylinder motor, the left side of which is shown in one of the illustrations, is water-cooled with the cylinders cast in pairs. The cylinders have a bore of 3⅜ inches and a stroke of 3¾ inches. They are of the L type, the inlet and exhaust valves being both located on the left side of the motor and are interchangeable. The valve-pushers are enclosed by removable plates to protect them from dirt and yet allow of easy adjustment.

A Schebler carbureter is used and the throttle is controlled, in addition to the regular hand lever on the steering post, by a foot accelerator which also is connected to the clutch pedal for idling the motor when changing gears or for the necessary street stops. The high-tension Bosch magneto is located on the left-hand side of the crankcase, and in conjunction with a battery forms the dual ignition system.

Motion is transmitted to the gears by a cone clutch having a leather face with cork inserts. The clutch runs in an oil bath in which there is an overflow tube to prevent the oil rising above a predetermined level and causing the clutch to slip. The selective sliding gearset is housed in an aluminum case. There are three speeds forward and a reverse operated by a hand lever at the driver's right.

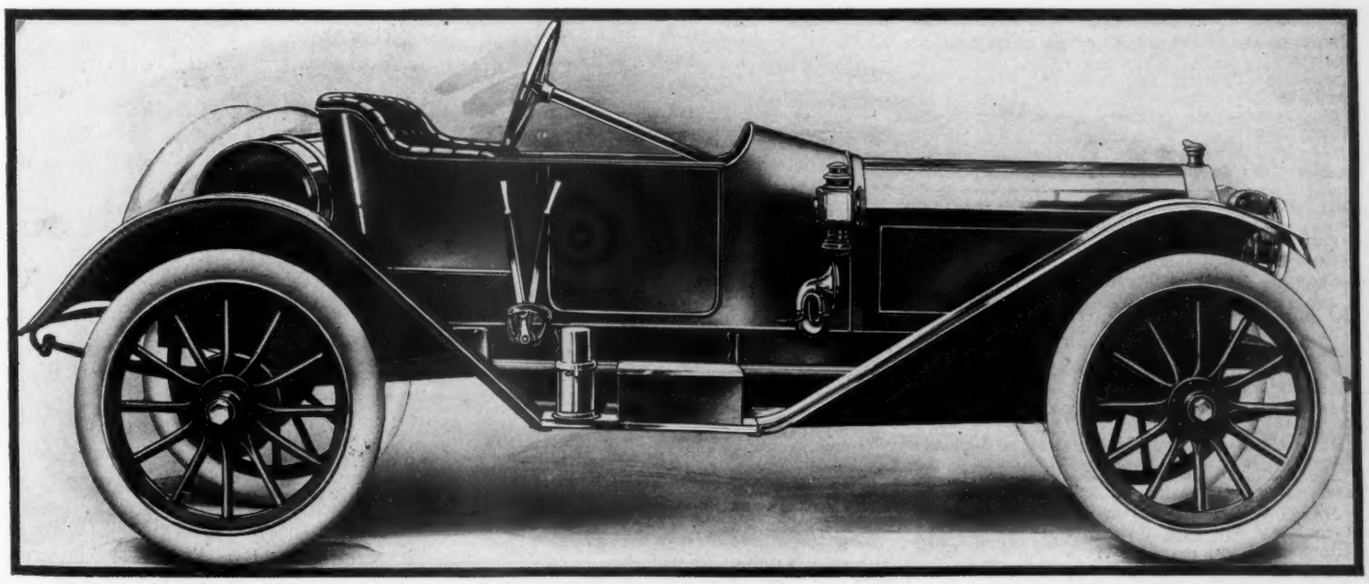
Roller bearings are used throughout the semi-floating rear axle. The bevel gear differential is housed in a compact malleable iron case with a removable cover from which the entire differential may be taken out. The front axle is an I-beam drop forging, with extra heavy ball bearings. The frame is a pressed-steel channel arched above the rear axle to provide increased spring action with the car hung low.

A Mercedes type radiator of large capacity provides the cooling surface and a ball-bearing fan located behind the radiator and is belt-driven from the crankshaft. Braking facilities are provided by expanding and contracting brakes which operate on 12-inch drums on the rear wheels. The lubricating system is of the automatic force-feed type.

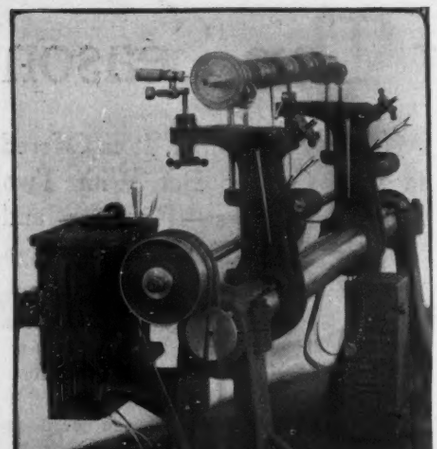
The chassis has a wheelbase of 115 inches and wheels 36 inches in diameter are used in both front and rear. The body is hung on semi-elliptic springs in front and ¾-elliptic springs in the rear. The motor and gearset form a unit power plant, the flywheel and clutch at the rear of the motor being enclosed in a housing which also covers the gearset which is shown in the illustration.

Drainage of oil from the different parts of the power plant is provided for by three oil cocks in the bottom of the crankcase, and one each in the clutch and gearset housing. Compression relief cocks fitted with priming cups are screwed into the head of each cylinder to permit of easy starting of the motor in cold weather.

The racy lines of the roadster body are clearly shown in the lower illustration on this page.



THE HAVERS SIX FORE-DOOR ROADSTER



INSPECTING MOLINE CRANKSHAFTS

The crankshaft is placed in the special balancing machine and rotated rapidly. Fingers bear upon each end of the crankshaft so that any eccentricity will cause the white pointer to swing. In this illustration the crankshaft is running at high speed, but it will be seen that it is in balance, as the two white pointers are stationary

Coming Motor Events

May 14—Cataluna cup road race, Spain.

May 16-19—Four-leaf clover endurance run of Automobile Club of Washington, D. C.

May 21—Hill-climb, Limonest, France.

May 21—Ries hill-climb, Austria.

May 25—Touring car kilometer speed trials, Le Mans, France.

May 25—Fuel economy test, Chicago Motor Club.

May 27-31—Five-day tour to Indianapolis of Chicago Automobile Club.

May 28—Hill-climb, touring cars, Le Mans, France.

May 28—Touring car reliability trials in Germany.

May 29-31—Tour to Indianapolis of Chicago Motor Club.

May 30—Reliability run of Missouri Automobile Club from St. Louis.

May 30—Five-hundred-mile international sweepstakes race, Indianapolis motor speedway.

May 25 or 28—Meuse hill-climb, Belgium.

June 1—Speed trials, Bucarest, Roumania.

June 4—Hill-climb, Trieste, Australia.

June 8—Algonquin hill-climb, Chicago Motor Club.

June 16-20—Little Glidden tour of Hyperion Field and Motor Club of Des Moines, Ia.

June 18—Voiturette and light-car road races, France.

June 19-25—Glidden tour from Washington, D. C., to Ottawa, Canada.

June 25—Grand prix of Automobile Club of France.

June 25-July 2—Endurance contest, Denmark.

July 1-3—Reliability run of Motor Contest Association through Catskills.

July 4—Track meet of Wolverine Automobile Club of Detroit.

July 4-20—Prince Henry tour.

July 9—French grand prix road races.

Among the Makers

HANDLING Saurer Publicity — Rollin W. Hutchinson, Jr., M. E., who was for a long time associated with the Westinghouse interests, has been appointed advertising and publicity manager of the Saurer Motor Co., 30 Church street, New York.

Van Horn Selling Horns—T. H. Van Horn has been appointed western sales manager for the Standard Electric Co., of Racine, Wis., which is now manufacturing a new type of electric horn. Mr. Van Horn will have headquarters on the Pacific coast.

Warren Succeeds Elmer—The appointment of C. B. Warren as general manager of the Haynes Automobile Co. is announced. Mr. Warren leaves the position of sales manager to take up the general management, and succeeds H. H. Elmer, recently resigned.

May Make Trucks—The Holbrook-Armstrong Iron Co., Racine, Wis., which recently increased its capital stock from $100,000 to $400,000, now is engaging in the manufacture of motors, gears, shafts and engine and motor accessories on a large scale. About $40,000 worth of new equipment has been added. Recently the Holbrook-Armstrong company constructed a large motor truck for the Racine-Sattley Co., implement and carriage manufacturer, and it is likely that a line of motor trucks will be added to its other interests before long.

Inventors Co-operating — The Racine Automobile and Motor Works is the style of a new corporation formed at Racine, Wis., last week. The incorporators are former employes of the several large car works at Racine, as follows: George Gammelguard, Soren Petersen, Jens Mikkelson and Carl Hylberg. The company is capitalized at $5,000, but this will be increased from time to time. Each of the incorporators is the owner of several patents pertaining to motors, transmissions, axles and other parts and have joined in the corporation for a community of interest. A shop has been leased and operations will begin at once.

Making Four-Wheel Drive Cars—The Four-Wheel-Drive Automobile Co., of Clintonville, Wis., has finished five seven-passenger touring cars for the market and a like number are under way. All patterns have been completed for a motor truck to be produced by the company, which will embody the four-wheel-drive principle. At present the company is considerably handicapped by lack of space, but after July 1 will occupy its large new factory. Operations at this time are confined to the former shops of Zachow & Besserdich, who are the inventors of the drive employed in the new cars. Last week applications for several important patents were forwarded to Washington. One of these is on a device which permits of selecting either front or back-wheel drive at will, or both. In case of accident to either drive, one will always be serviceable, or when the pull is easy and economy is the object, only one set of drive can be employed.

Detroit Attracts Experts—There has been an exodus of body builders and expert finishers from Racine, Wis., to Detroit during the last few weeks. During the early winter many body men left Detroit and were employed by the Racine Mfg. Co. and other Racine works, but now that the rush season in the Michigan motor car center is at its height, they have returned to resume their former connections.

Interesting the Workmen—A policy of cultivating, co-operation, loyalty and fellowship among its employes has been adopted by the Willys-Overland Co., of Toledo, where 4,000 men are employed. There not only is a factory band of fifty pieces and a glee club of a score of men—both of them musical organizations of first rank—but an athletic club of large dimensions, containing several sub-organizations, such as track team, football team, basketball team, running team and a baseball team of no small reputation. One of the most important plans underway at the Willys-Overland plant this year is the holding of an Overland field day, at which there will take place various athletic contests and a ball game, all of which will be enlivened by the musoical organizations.

Diamond Service Stations—In 5 months the Diamond tire service stations have been placed in all the larger cities for the benefit of motorists and accessory dealers. There were twenty-five Diamond offices when this plan was decided upon. These have now grown to fifty-four. The most recent offices opened are in three California cities, Sacramento, 728 I street; Fresno, K and Merced streets, and San Diego, 1260 Fourth street. Offices will be opened in a few days in Oakland, Cal., and Spokane, Wash. Other service stations now open are in the following cities: New York, N. Y.; Newark, N. J.; Albany, N. Y.; Brooklyn, N. Y.; Boston, Mass.; Springfield, Mass.; Providence, R. I.; Portland, Me.; Philadelphia, Pa.; Washington, D. C.; Baltimore, Md.; Richmond, Va.; Buffalo, N. Y.; Rochester, N. Y.; Syracuse, N. Y.; Detroit, Mich.; Pittsburg, Pa.; Cleveland, O.; Columbus, O.; Toledo, O.; Cincinnati, O.; Dayton, O.; Louisville, Ky.; Chicago, Ill.; Des Moines, Ia.; Indianapolis, Ind.; Milwaukee, Wis.; Denver, Colo.; Salt Lake City, Utah; St. Louis, Mo.; Minneapolis, Minn.; Kansas City, Mo.; Oklahoma City, Okla.; Omaha, Neb.; Atlanta, Ga.; Mem-

and Dealers

phis, Tenn.; Jacksonville, Fla.; New Orleans, La.; Houston, Texas; Dallas, Texas; San Antonio, Texas; San Francisco, Cal.; Los Angeles, Cal.; Seattle, Wash.; Portland, Ore.; Toronto, Can.; Mexico City, Mex.; Paris, France.

Belden Company Formed—The Belden Engineering Co. has been organized in Pittsburg by Edward H. Belden, David E. Mitchell and M. T. Kearney. It will manufacture motor trucks, motor cars, motor boats and aeroplanes from patents controlled by E. H. Belden and others of Pittsburg.

Locates in Warren—The Universal Motor Co. is arranging to build a large plant at Warren, Ohio. It will manufacture a big truck designed to meet all kinds of service and also a small truck with wheel motors. The company investigated sites in several cities before locating in Warren and is now preparing to go ahead at once with the erection of a modern plant.

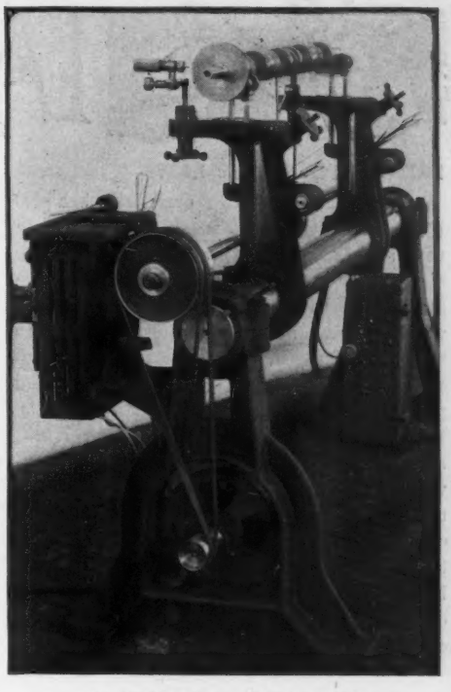
Hess Foundry in Operation—The new foundry of the Hess Steel Castings Co., Bridgeton, N. J., is now completed and castings are being poured. Castings made of this process can be poured in intricate shapes quite unknown in the steel founders' art as hitherto practiced, it is claimed. For example, thin ribs can be set on thick sections with small fillets and with no sponginess of texture where the light and heavy sections join. The allowance required for finishing also is very small, partly because the shrinkage is very uniform, but chiefly because the metal is sound from the surface down, rendering it unnecessary to machine off from ¼ to ½ inch in order to reach good metal. Another advantage of the process is the small time necessary for annealing, only a few hours being usually required.

Will Make Motors—The Federal Motor Works has acquired the motor department of the Willys-Overland Co., located at W. Fifteenth street and the Big Four Railroad, Indianapolis. The concentrating of the manufacture of Overland cars at the Toledo plant was responsible for the Federal Motor Works getting possession of this property. The factory has been devoted to the exclusive manufacturing of motors for the past 2 years. The present capacity is approximately fifty motors per day. It is the intention of the new company to manufacture motors for the trade.

Norwalk Company Election—The stockholders of the Norwalk Motor Car Co. held their annual meeting in Norwalk, O., recently. The report of the company for the past 12 months was most satisfactory. The first 6 months, during which time the car was being perfected, showed a loss. This was recovered during the next 6 months, the last 3 months being especially good, each month showing a substantial gain. The old board of directors was reelected as follows: Arthur Skadden, C. F. Jackson, I. W. Goodell, J. E. Russell, Charles Glasser, J. R. McKnight and Fred Taylor. At a subsequent meeting of the directors Arthur Skadden was elected president; C. F. Jackson vice-president; Charles Glasser secretary and I. W. Goodell treasurer.

WEIGHING CYLINDERS

The practice of the E-M-F Co. is to weigh the cylinders and connecting rods used in the engines of the E-M-F and Flanders, in order to get a perfectly balanced motor. Each must register to a set standard before being accepted by the factory superintendents



CRANKSHAFT BALANCING MACHINE

The crankshafts of Moline motors are tested for balance in a special machine. A white pointer is vibrated if either end of the crankshaft is out of balance. In this illustration the vibration of the indicators shows that the shaft is not running in balance. It also shows that the flange end is more out of balance than the other end

The Motorists' Bookman

Book For Students

A book especially useful to students is one entitled "Questions and Answers for Automobile Students and Mechanics." It contains 600 questions and answers, and covers 140 pages. The questions are given in one group, the answers in another, which makes it convenient for self-instruction, as the questions can be used alone with the answers if needed for reference on another page. There are twelve sets of questions, with answers, namely: Motor cars, engines, carbureter, electricity, ignition, cooling systems, transmission and gearing, tires, troubles, timing and valve-setting, motors and mechanism, and driving self-taught. Lastly, minor subjects are covered in a brief catechism which deals with all the factors which go to make up the power plant of a modern motor car. Transmission and gearing is given the most attention, having eighty-six questions and answers devoted to it. Here it explains the advantages and disadvantages of a fixed axle; direct drive is explained; the clutch is dealt with as well as the different gears and all questions are asked and answered in a plain, clear manner. This book retails at $1 and is written by Thomas H. Russell, A.M., M.E. The Charles C. Thompson Co., Chicago.

Legal Lights and Side Lights

FRENCH TO REVISE LAWS

A PARLIAMENTARY committee has prepared for the French government a new set of laws governing traffic on the highways. Although motorists in France have little to complain of, in comparison with other countries, the present laws are most unsatisfactory, and are of such a nature that if applied rigorously they would practically make motor car traffic impossible. For instance, not only is a higher speed than 18 miles an hour illegal on the highways of France, but no manufacturer has the right to put into circulation motor cars capable of exceeding this speed. Obviously the law is allowed to remain a dead letter, but until it is repealed there always is a danger of it being applied with unforeseen consequences.

Under the recommendations for the new code there are two suggestions regarding speed limits. The most popular, and the one that doubtless will be adopted, for it is in harmony with the spirit of the application of the old law, is that all speed limits should be abolished, the safeguard of the public lying in a clause to the effect that no vehicle must be driven at an excessive speed. Thus speed will depend on circumstances, and it will be possible for a car to travel at 60 miles an hour over a deserted highway without any interference, and to be stopped for a speed of 6 miles an hour under exceptionally dangerous and difficult conditions. This, indeed, is the attitude that has been adopted by most administrators of the law, despite the power given them to apply an arbitrary speed limit. The second recommendation of the committee is that the speed limits should be raised about 50 per cent, with limits applied according to the types of vehicles. There is very little likelihood of this being adopted.

Light for all vehicles will be made compulsory. This will mean that all slow-traveling horse teams will have to carry one lantern, showing a white light ahead and a red light behind. This is a regulation applied in many localities, but it has not the backing of the national law.

The most drastic change is that the rule of the road should be to keep to the left, as is now done in England and certain portions of the continent of Europe. It is very doubtful, however, if such a change will receive the sanction of parliament, for although all who have tried the two systems are convinced that it is more convenient to travel on the left than the right-hand side of the road, such a change would cause a tremendous upheaval, and unless adopted at the same time by neighboring countries would lead to serious accidents. A proof that the English rule of the road has decided advantages can be found in the fact that it has now become common to place the driver on the left-hand side of the car whenever the vehicle is intended for city service.

DETROIT BECOMES STRICT

One of the most drastic measures governing motorists on the code of any American municipality has been favorably recommended to the Detroit common council and probably will be passed at the coming session. The measure is known as the Littlefield ordinance and was introduced by Alderman Sherman R. Littlefield. Its most drastic provisions compel motorists to come to a dead stop before crossing any street in which there is an intersecting car line, and imposes a similar stop before passing any street car which is standing at a street crossing or trolley station.

The Littlefield ordinance follows a number of serious accidents in which pedestrians have been run down while getting off cars. The ordinance has the hearty approval of Police Commissioner Croul and is patterned somewhat after the ordinance which now prevails in Pittsburg. Rigid enforcement is promised if the measure passes. The Littlefield ordinance also makes more clear a number of rules of the road. One of the new features places a penalty on any motorist who passes to to the left of a moving street car. Jail penalties for second offenses are made mandatory. The ordinance undoubtedly will be tested, but it has been approved after careful examination by the corporation counsel.

Detroit motorists have endeavored unsuccessfully to secure several mitigations of the ordinance. The Detroit Automobile Dealers' Association, the Automobile Club of Detroit and the Wolverine Automobile Club were represented at all the committee sessions but the bill was favorably recommended by a unanimous vote.

Tests of the ordinance, made in an informal way, have demonstrated that it is practically impossible for a motorist to observe its provisions and make better time than that of the street car in company of which he leaves the center of the city. Undoubtedly the ordinance will result in a removal of much of the motor traffic from Woodward avenue and the other streets of the city occupied by car lines. That this is one of the purposes of the ordinance is admitted by its most prominent sponsors.

Despite the favorable report of the committee, an urgent effort is in progress to secure amendment of several points in the ordinance before its passage by the council.

PACIFIC HIGHWAY PLANS

Seattle, Wash., May 6—Plans for promotion campaign running over a period of 4 years were outlined by the executive council of the Pacific Highway Association at a recent meeting in Seattle. It was unanimously decided to continue the work the organization has been doing to forward the construction of the international highway along the western borders of British Columbia, Washington, Oregon and California. The plan is to build such a highway as may be traversed with ease and comfort at any time during the year.

It was agreed that the work that the association has done has been productive of a great deal of public sentiment in favor of concentrated effort in highway construction on the Pacific coast, not only in the United States but British Columbia as well. The fact that the upper house of the late Washington legislature killed the Pacific highway measure has not discouraged the friends of this important road project, but has served rather to encourage them in that the widespread popularity of the Pacific highway move was not known until it was turned down by the Washington legislators.

Since that time protest and condemnation have come in from all sides. Much activity is being manifested by counties in the state of Washington through which the Pacific highway passes. This is especially true of Cowlitz county, where a convict camp has been established all winter, completing the road around Carroll's Point, which has been named as the worst piece of highway between Los Angeles and Vancouver.

VETOED BY GOVERNOR

The Dunlap bill passed by the recent Iowa legislative session, which requires that teams turn out so that motor cars may pass them to the left has been vetoed by Governor B. F. Carroll. "As to the purpose of the bill I have no objections, but its provisions regulating passing when one party overtakes another are entirely too drastic," said the governor in vetoing the measure. The bill was modeled in many respects after the New York law.

Brief Business Announcements

AKRON, O.—C. E. Mills has organized the Akron Taxicab Co.

Cincinnati, O.—The Anchor Motor Co. has reduced its capital stock from $50,000 to $1,000.

St. Louis, Mo.—The recently organized Marathon Motor Sales Co. has opened new sales rooms on Locust street, at Garrison avenue.

Bucyrus, O.—Samuel Hirtz has bought the garage business of Wade Chambers on South Sandusky avenue and has assumed charge of the business.

Spokane, Wash.—McMillan & McInnis have recently completed a $4,000 garage at Sprague avenue and Adams street. The building is constructed of brick and concrete.

Boston, Mass.—The Houpt-Rockwell is now represented in Boston, having been added to the Taylor Motor Sales Co. line, which also has the Westcott and the Decatur. The Herreshoff has been dropped by this agency.

Detroit, Mich.—The Metzger Motor Car Co. announces the appointment of W. E. Rudy as a direct factory representative for the Everitt in Lima, O. Another agency appointment is that of William L. Hodges, of Saratoga Springs, N. Y.

Columbus, O.—The Ohio Auto Accessory Co. has been incorporated with an authorized capital of $30,000 to manufacture and sell all kinds of accessories for motor vehicles. The incorporators are W. C. Weatherbolt, Nathan Myer, A. E. Shatford, William Bott and J. H. Smith.

Cleveland, O.—The C. &. M. Garage and Sales Co. has been incorporated with a capital of $5,000 to operate a garage and act as sales agents and deal in accessories for motor cars. The incorporators are F. B. Conklin, R. V. McKillip, Edward Younger, W. K. Caldwell and F. G. Castle.

Detroit, Mich.—The Detroit branch of the Willard Storage Battery Co. has been obliged to find larger quarters, which have been secured at 1191 Woodward avenue, where a sales room and battery repair department will be ready for business after May 15. This branch is in charge of Max G. Hilman.

Indianapolis, Ind.—The following new agents to handle the Cole have been appointed: Suffolk Electric Co., Huntington, L. I.; Cole Motor Car Co., 1103 Commonwealth building, Pittsburg; Lewis LeGrand's Son, Wilkes-Barre, Pa.; Pennsylvania Auto Co., 515 Mulberry street, Scranton, Pa.; Adams Sporting Goods House, Wilkes-Barre, Pa.; Seminole Motor Co., Jacksonville, Fla.; Wilson & Beckwith, Tampa, Fla.; Camden Motor Co., Camden, S. C.; E. E. Loving, Memphis, Tenn.; H. N. Berry, Greenville, Miss.; R. J. Straw, Mankato, Minn.

New Washington, O.—Edward Geissman has opened a new garage and repair shop in New Washington.

San Antonio, Tex.—Fred P. Warren will handle the Marmon cars throughout southwest Texas, with headquarters at 232 Avenue C, San Antonio.

Cleveland, O.—The Cleveland Auto Livery Co. has been incorporated with a capital of $10,000 to operate a motor car livery business, by R. M. Bauer and others.

Cleveland, O.—The Standard Motor Car Co. filed papers with the secretary of state, reducing its capital stock from $30,000 to $10,000. C. F. Mecker is president of the corporation.

New York—A. T. Henderson, recently New York representative for United Manufacturers, has joined the Atlas Chain Co., of Brooklyn, N. Y., as general sales manager, and will have charge of the selling forces of that company.

Indianapolis, Ind.—Contracts have been closed by the Henderson Motor Sales Co., distributor for the Cole, for the following new agencies: Grundy Motor Sales Co., Los Angeles, Cal.; Imperial Auto Co., 960 McMillan street, Cincinnati, O.; Keely's garage, Sanford, Fla.; M. R. Thackaberry, Sterling, Ill.; Paul Stankey, Erwin, S. D.

Milwaukee, Wis.—The Milwaukee agency for the Cole now occupies improved and larger quarters at 322 East North avenue, having abandoned the former garage at 401 Rotal place. The new quarters were formerly occupied by the Milwaukee branch of the Buick Motor Co. as repair shops and station, but all Buick interests are now concentrated in the fine new building on Wisconsin street, opposite the Federal building.

Boston, Mass.—The Penn 30 is the latest arrival in Hub circles, the Croxton Motor Car Co. having taken it on a few days ago.

Buffalo, N. Y.—The Marmon cars will be represented through western New York territory by H. H. Hall, 257 Delaware avenue.

Boston, Mass.—The Norwalk is a recent addition to the Boston colony, the Coward Auto Co., of Park square, having taken the agency for it.

Indianapolis, Ind.—The American Sales Co., 430 North Capitol avenue, has become Indiana distributor for the Monitor line of commercial vehicles.

Bridgeport, Conn.—J. T. Roche, Jr., formerly Locomobile purchasing agent, has recently assumed the position of sales manager of the Locomobile truck department.

Grand Rapids, Mich.—The Guarantee Vulcanizing Works has leased the second floor of the building at 167-169 North Ionia street and will specialize in vulcanizing tires. The company recently was organized by John T. Bruce, of Casnovia.

Indianapolis, Ind.—Frank E. Westcott, who has represented the Continental branch of the United States Tire Co. in Indiana, has resigned and taken a place with the R. M. Owen Sales Co. He will travel in the states of Indiana, Ohio, Kentucky, Tennessee and Illinois in his new position.

Detroit, Mich.—The Warren Motor Car Co. announces the following agencies just established: Williams & Teague, Atlanta, Ga.; Nieman & Taylor, Harlan, Iowa; Mecklenburg Auto Co., Charlotte, N. C.; Michael Griffin, Baltimore, Md.; E. F. Birdsell, Evart, Mich.; William Whyte, Auburn, N. Y.; H. W. Brown, Binghamton, N. Y.; G. F. Coon, Bucklin, Kan.

Greenfield, Ind.—A company is being promoted at Greenfield for the purpose of establishing motor car service between Mount Auburn and Greenfield, touching the following places: Mount Auburn, Marietta, Smithland, Shelbyville, Marion, Morristown and Greenfield. There are to be two round trips daily. The places in question are not now connected either by steam or electric railway lines.

Columbus, O.—The L. & E. Garage and Sales Co. is the name of a partnership consisting of J. E. Lacey and H. T. Edwards, which will open a garage and repair business at 58-62 East Spring street, Columbus, as soon as the United Motor Columbus Co. moves to the new location on North Fourth street. The United Motor-Columbus Co. will occupy a large sales room with repair shop near the corner of Fourth and Chestnut street.

Recent Incorporations

Rochester, N. Y.—Rochester Motor Fire Pump Co., capital stock $150,000; directors, R. S. McMahon, L. Fuchs, James T. McGovern, J. L. Hotchkiss and A. E. Tuck.

Pittsburg, Pa.—Hercules Tire and Rubber Co., capital stock $500,000; incorporators, E. G. Bossinger, J. T. Murray and E. L. Cleveland.

Dayton, O.—Republican Gasoline Co., capital stock $250,000; incorporator, A. F. Clarke.

Richmond, Va.—National Automatic Machine Co., capital stock $5,000; to manufacture and sell automatic weighing machines. Officers: President, Robert Brooke; secretary, John Brandt; treasurer, C. R. Button.

Richmond, Va.—Kline Motor Corporation, capital stock $500,000; to manufacture motor cars.

New York—Reo Automobile Co., capital stock $25,000; incorporators: A. Stewart, C. C. Ramsey and E. H. Taggart.

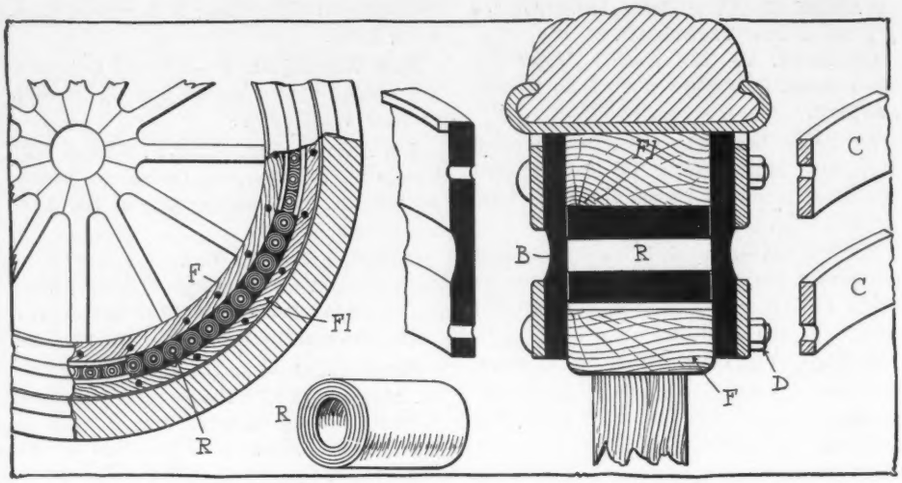
New York—Ewing American Motor Co., capital stock $1,500,000; to manufacture and deal in motor cars, etc.; incorporators: C. A. Hamlin, A. P. Anderson and J. Gorham, Jr.

Development Briefs

Sewell Cushion Wheel

THE SEWELL cushion wheel intended for truck use is designed to allow of the use of a comparatively small size of rubber tire, and give a greater resilience than accomplished with larger tires. The resilient feature in this wheel consists of rubber rolls R, which fill an annular space between the inner wood felloe F and the outer wood felloe F1. These rubber rolls or bumpers are mounted crosswise between the felloes and fill the entire space. The thickness of the rolls is governed by the load of the car, a 5-ton truck having a heavier roll than a 2-ton one.

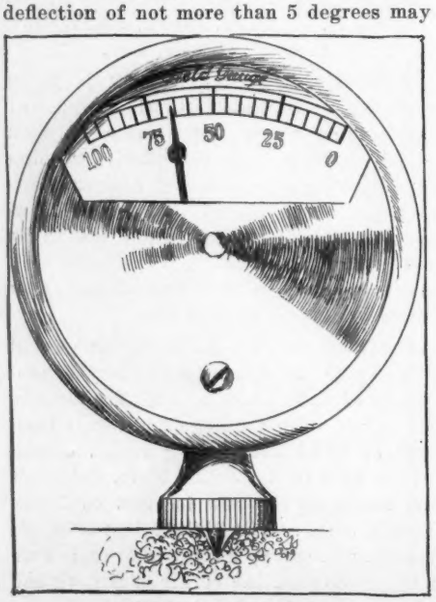
These rubber rolls, however, do not constitute the sum total of the resiliency in the wheel. There are in addition two rubber flanges B, which connect between the inner and outer felloes F and F1, and are held thereto by transverse bolts D, which clamps steel rings or bands against the edge of the rubber. These elastic bands or flanges, connecting as they do the outer and inner felloes, form an elastic suspension for the entire wheel and also form a water-tight construction for the protection of the inner rolls R. It is claimed that with this construction a solid tire will give a very great additional mileage.



SEWELL CUSHION WHEEL, INTENDED FOR MOTOR TRUCK USE

Tire Yield Gauge

A simple device for measuring the resilience of rubber and other similar compositions has been brought out by the Shore Instrument and Mfg. Co. It is designated the Yield gauge. With this instrument a sensitive blunt point is pressed against the rubber, or other material to be tested, and the amount of pressure required is at once indicated on the scale. On this scale the indicating hand normally rests at 100, and when testing a very soft substance a deflection of not more than 5 degrees may be shown, which would read 95 on the scale and is interpreted as a yield of 95 per cent, and a resistance from the yield of but 5 per cent. On the other hand a very hard substance under test may not show any yield, the indicating hand moving direct to 0 and reading 100 per cent hard. It is stated that with this gauge a good tire shows a yield of 55 to 60 per cent, whereas bad ones will show from 35 to 40 per cent. This does not imply that the softer the tire the better it is.



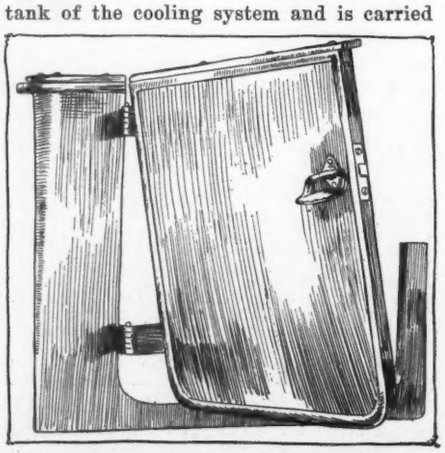
YIELD TIRE GAUGE

Matchless Gas Lighter

In order to facilitate lighting acetylene headlights, the Matchless Lighter Co., Boston, has brought out a simple electrical device somewhat resembling a pair of pliers, which is claimed to give from 3,000 to 5,000 sparks for ignition work. The spark is produced by a steel point scratching on a piece of flint.

Se-Ment-Ol Radiator Compound

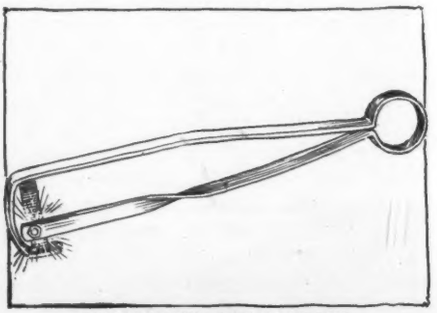
A preparation for repairing leaky radiators has been brought out by the Northwestern Chemical Co., of Marietta, O., under the name of Se-ment-ol. This is a sort of cement which is poured into the tank of the cooling system and is carried through the system by the water. Where the water leaks out through holes or cracks in the radiator, the cement hardens and stops the leak. In a recent test of the compound an old horizontal tube radiator having one large leak and several smaller ones was taken. The compound was poured into the tank without any preparation of the radiator. The motor was then run for 15 minutes, then the motor was stopped, and the cement allowed to set for the same length of time. The leakage gradually diminished until, at the end of one hour it was stopped.



AUTO SPECIALTY MFG. CO.'S FORE-DOOR

Detachable Fore Doors

The present advent of the fore-door body has brought about the marketing of fore doors for old models of the open body type. Along this line the Auto Specialty Mfg. Co., Indianapolis, Ind., makes doors to suit the different bodies and bring them up to date. In all of these a standard form of door is used and in conjunction with it, it is frequently necessary to incorporate a panel at one side or the other when the space between the front seat and the dash is too great for the door width. In such case the general plan is to place a vertical panel between the door and the dash, occupying the space above the sloping toeboard. It is claimed that these fore doors can be attached by the use of three bolts and three screws.



MATCHLESS GAS LIGHTER